W. S.
3-31-04

CITY OF ALEXANDRIA
CITY COUNCIL WORK SESSION
Wednesday, March 31, 2004, 5:30 pm

AIR QUALITY AND MIRANT POTOMAC RIVER POWER PLANT

Transportation & Environmental Services

PURPOSE OF THIS DISCUSSION

Provide City Council with Overview of Air Quality Issues

Update City Council on Air Quality issues relating to Mirant

Seek City Council's concurrence or guidance on future actions

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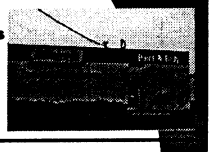
Sources of Air Pollution

- LOCAL SOURCES:
  - Area Sources
  - Mobile Sources
  - Point Sources
- DISTANT SOURCES:
  - Transport Issues
  - Power Plants



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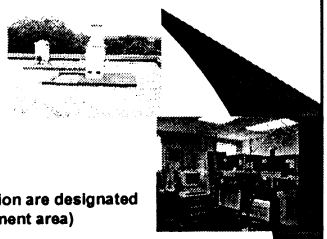
Ambient Air Monitoring

National Ambient Air Quality Standards:

- CO (Carbon Monoxide)
- NOx (Oxides of Nitrogen)
- SO2 (Sulfur Dioxide)
- Lead
- PM 10, PM 2.5
- Ozone (Alexandria and the region are designated as a severe non-attainment area)



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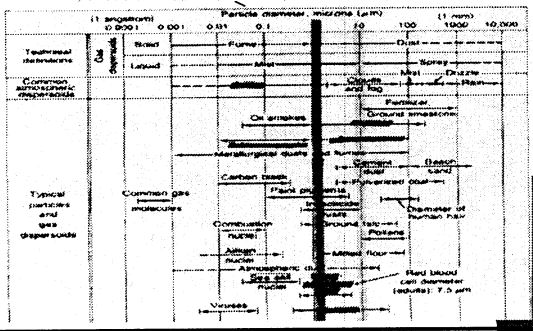
What is the size of these Particles



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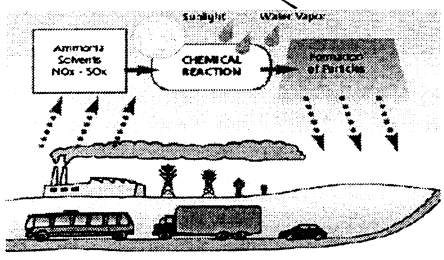
TYPES OF FINE PARTICULATES: Primary Vs. Secondary



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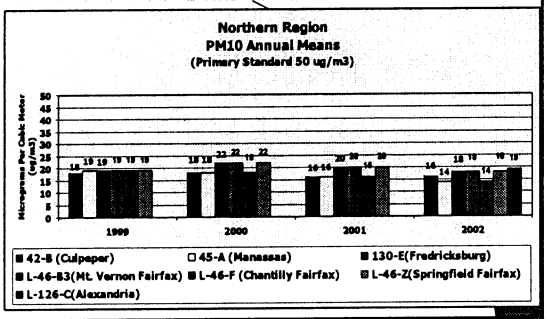
Monitored PM10 Data



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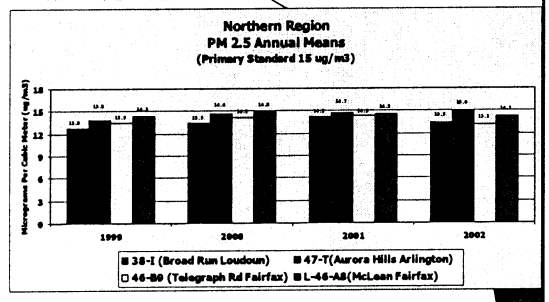
Monitored PM 2.5 Data



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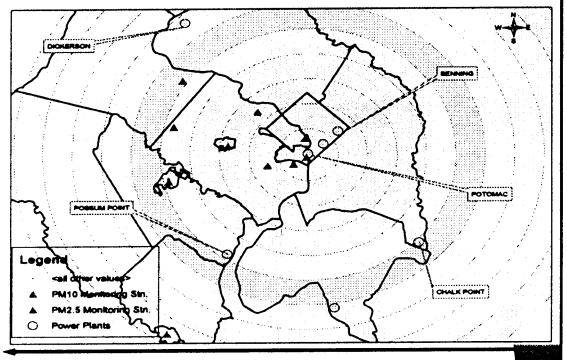
REGIONAL POWER PLANTS AND AIR MONITORING STATIONS



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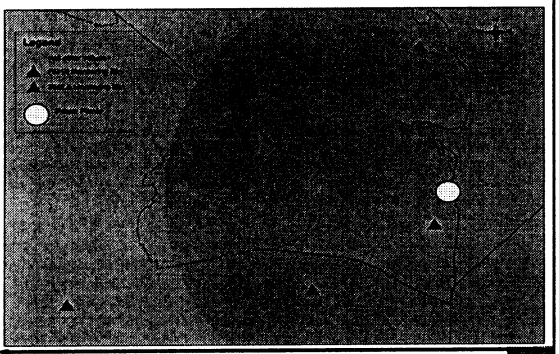
AIR MONITORING STATIONS AND DISTANCE FROM MIRANT



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MIRANT, Being A Large Industrial Facility

- HAS an impact on the community
  - Coal and Ash Handling
  - Vehicle Traffic
  - Railroad Deliveries
  - Noise from Plant Operation
  - Last but not the least AIR POLLUTION

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Mirant Implemented Control Measures

High-efficiency precipitators to eliminate any visible emissions and control particulate emissions

Use of low-sulfur coal (reduces sulfur emissions)

Modified boiler controls to lower nitrogen oxide (NOx) emissions by 28% since 1990

Added Continuous Emissions Monitoring System on all stacks to measure Opacity, SO2, NOx and CO2

Bag house on fly-ash handling silo

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Fugitive Dust Control Measures

Current Control Measures include:

- Use of encrusting agent on the coal pile.
- Use of surfactant to reduce coal dust [illegible] when dropping to the pile.
- Use of dumper door curtain to enclose the [illegible] handling during unloading process.
- Compaction/ management of the coal pile.

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Summary of Chimento-Hertel Report

- COMPILATION OF
  - General health studies documenting that long [illegible] exposure to fine particulate matter may pose [illegible]
  - Dr. Levy's Five Power Plant Study
  - Virginia DEQ Analysis of particulates on the windo[illegible]
  - University of Pennsylvania Study
- FOCUS ON PARTICULATES: PM2.5

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City's Actions

- INCREASED PM 10 AND PM 2.5 MONITORING
- INCREASED FACILITY INSPECTIONS
- CLOSE COORDINATION WITH VADEQ, EPA, D[illegible] ENFORCEMENT ACTIONS ON NOx ISSUES
- REGIONAL LEVEL AIR QUALITY PLANNING
- COORDINATE WITH STATE/FEDERAL LEGISLATORS
- HIRING DR. JONATHAN LEVY FOR ADDRESSING PM2.5 IMPACTS ON THE CITY: DRAFT REPORT

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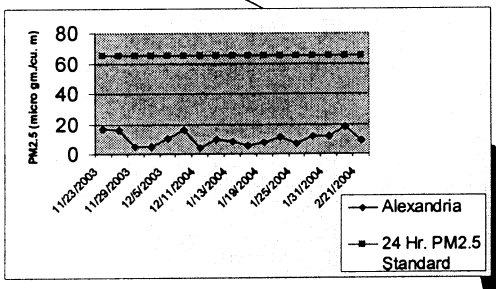
PM 2.5 monitoring at 517 St. Asaph St



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City's Outside Consultant for Mirant and $PM_{2.5}$ issues

Dr. Jonathan I. Levy

Assistant Professor of Environmental Health and Risk Assessment, Departments of Environmental Health and Health Policy and Management
Harvard School of Public Health

Publications include 30+ peer-reviewed journal publications, focused on air pollution exposures and health risks

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Dr. Levy's work quoted in Chimento-Hertel Report – 5 Power Plant Study

The Importance of Population Susceptibility for Air Pollution Risk Assessment: A Case Study of Power Plants Near Washington, D.C., *Jonathan I. Levy, Lauren A. Greco, and John D. Spengler.* Environmental Health Perspectives, Volume 110 No. 12 (2002), pp. 1253-1260

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	Benning	Chalk Point	Dickerson	Possum Point	Potomac River
Location	Washington, DC	Aquasco, MD	Dickerson, MD	Dumfries, VA	Alexandria, VA
Initial year of commercial operation	1968	1964	1959	1948	1949
Nameplate capacity (megawatts)	580	2046	588	1373	514
Heat input (million BTU, 1999)	3,304,107	85,352,274	33,592,811	28,930,805	32,100,184
Emissions (tons, 1999)					
SO_2	1,432	57,630	30,637	19,497	17,627
NOx	447	25,222	10,709	5,116	6,893
$PM_{2.5}$	12	304	14	156	106

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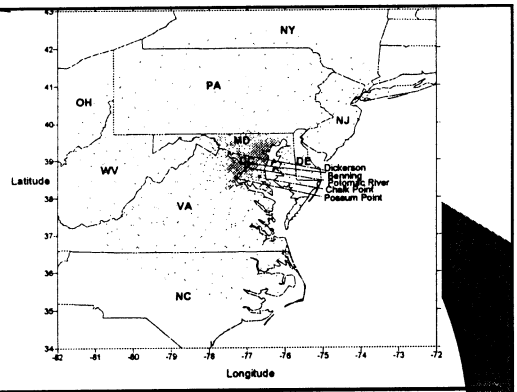

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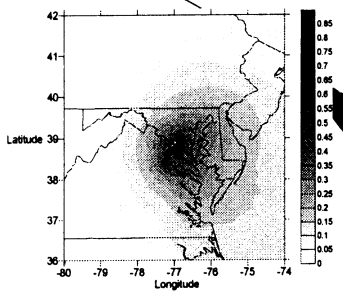
Total $PM_{2.5}$ concentration reductions, BACT at all 5 plants



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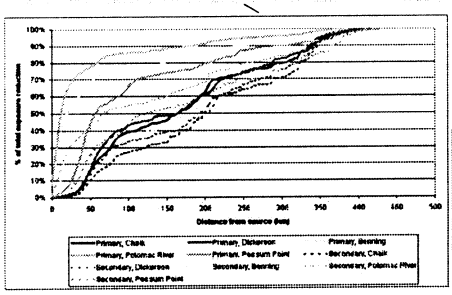
Distribution of total exposure reduction as a function of distance



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Baseline health estimates, standard approach (annual, primary + secondary PM)

Plant	Deaths/year	CHA/year	Asthma ERV/year
Benning	2	0.7	1.6
Chalk Point	100	30	68
Dickerson	60	17	40
Possum Point	50	14	36
Potomac River	59	16	41
Total	270	78	190

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Health benefits from BACT, standard approach (annual, primary + secondary PM)

Plant	Deaths/year	CHA/year	Asthma ERV/year
Benning	1	0.4	0.9
Chalk Point	79	23	52
Dickerson	49	14	32
Possum Point	39	11	28
Potomac River	38	11	27
Total	210	59	140

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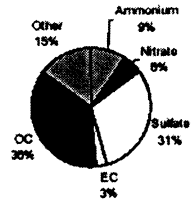
Analysis of Particulate Matter Impacts for the City of Alexandria

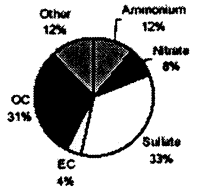
- Purpose:
  - To apply the methods and results from our earlier analysis, with a focus on the Potomac River power plant and the population of Alexandria
  - To compare the contributions of the Potomac River plant to $PM_{2.5}$ levels with contributions of other power plants and sources
  - To compare the health impacts in Alexandria with the regional health impacts

Composition of ambient $PM_{2.5}$ in Richmond and Washington

Richmond, VA $PM_{2.5}$ speciation



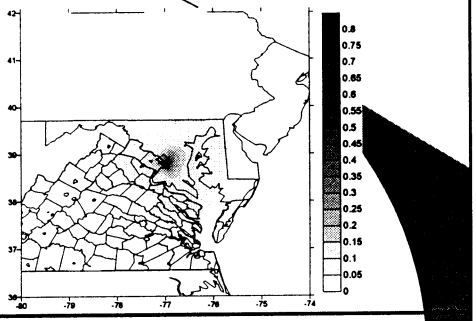
Washington, DC $PM_{2.5}$ speciation



Should we expect PM-related health impacts in Alexandria?

- Annual NAAQS for $PM_{2.5}$ is 15 $\mu g/m^3$
- Average $PM_{2.5}$ concentrations in Alexandria are approximately 13-15 $\mu g/m^3$, with a pronounced summer time peak
- NAAQS are not meant to be zero risk levels
- Current health evidence demonstrates effects from short-term and long-term exposure below NAAQS
- Although uncertainty remains, reasonable to conclude that $PM_{2.5}$ related health effects could be anticipated in Alexandria at current ambient concentrations.

$PM_{2.5}$ Concentration Increment from Potomac River



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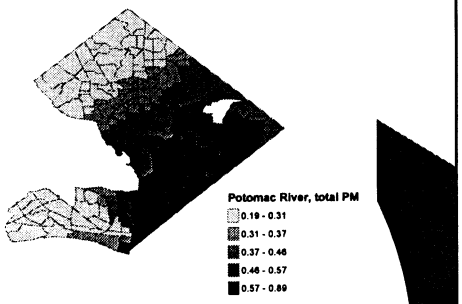
$PM_{2.5}$ Concentration Increment from Potomac River



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$PM_{2.5}$ Concentration Increment from Potomac River

- Maximum total $PM_{2.5}$ concentration increment caused by Potomac River is approximately 0.9 $\mu g/m^3$, 4 km from the plant (in Washington
- Within Alexandria, total $PM_{2.5}$ concentration increment ranges from 0.19-0.58 $\mu g/m^3$
- Gradient exists across Alexandria, with higher levels generally in closer proximity to the plant (although census tract housing Potomac River has relatively lower concentrations)

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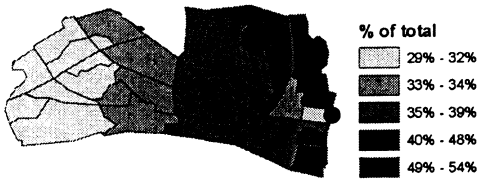
$PM_{2.5}$ Concentration Increment due to 5 power plants

- Aggregate contribution of five power plants to total $PM_{2.5}$ in Alexandria ranges from 0.63-1.1 $\mu g/m^3$ on annual average basis
  - Approximately 4-8% of ambient $PM_{2.5}$
  - Of this 4-8%, Potomac River contributes between 29% and 54% (i.e., it contributes 1-4% of ambient $PM_{2.5}$ in Alexandria)

% of $PM_{2.5}$ concentration increment from 5 power plants associated with Potomac River



Health Impacts in Alexandria

•Five power plants are estimated to contribute slightly over 2 deaths/year. (This number is to be understood in the context that the baseline number of deaths in Alexandria each year in 30+ age group (assumed at-risk population) is approximately 800.)

•Potomac River is estimated to contribute slightly less than 1 death/year.

	Deaths/year	CHA/year	Asthma ERV/year
Benning	0.02	0.005	0.008
Chalk Point	0.4	0.1	0.2
Dickerson	0.4	0.1	0.2
Possum Point	0.7	0.2	0.4
Potomac River	0.9	0.3	0.4
Total	2.3	0.7	1.2
% of total from Potomac River	37%	37%	36%
% of total in region	0.9%	0.9%	0.6%

Health Benefits in Alexandria of BACT

- **BACT at five power plants is estimated to have a public health benefit of 1.7 fewer deaths/year.**
- **BACT at Potomac River is estimated to have a public health benefit of 0.5 fewer deaths/year.**

	Deaths/year	CHA/year	Asthma ER/year
Benning	0.007	0.002	0.004
Chalk Point	0.3	0.09	0.2
Dickerson	0.3	0.09	0.2
Possum Point	0.5	0.2	0.3
Potomac River	0.5	0.2	0.3
Total	1.7	0.5	0.9
% of total from Potomac River	31%	31%	31%
% of total in region	0.8%	0.8%	0.6%

Conclusions (I)

- While the Potomac River plant is not the dominant contributor to either death or $PM_{2.5}$ concentrations in Alexandria, it is likely the single source that contributes most to PM levels in Alexandria.
- If BACT applied to five power plants, controls at Potomac River will provide highest benefits in Alexandria (comparable benefits from controls at Possum Point).

Conclusions (II)

- Important to realize strengths and weaknesses of estimates
  - Based on atmospheric dispersion models and large-scale epidemiology studies
    - Uncertainty exists, but estimates are most reasonable values
    - No other approach could yield this information
  - Regional dispersion model cannot capture very short-range effects

Conclusions (III)

- Reducing emissions from Potomac River and other power plants would provide most population health benefits regionally, but individuals "locally" would benefit most

NOx Issues

NOx is a precursor to Ozone. NOx reductions are required at the Mirant to meet the region's Ozone standard as part of the SIP process.

State Operating Permit is the tool VDEQ uses to require NOx reductions at Mirant.

Permit limits became effective in Summer 2003 and limits NOx [illegible] May 1, and September 30.

Mirant failed to meet the limit of 1,019 tons in 2003.

EPA and VDEQ issued NOVs.

NOx Control Alternatives

FUEL SWITCH.....Natural Gas
- Requires major upgrade
- Upgrade of the plant, Feasibility questionable
- High Capital costs

SOFA (Separate Overfire Air) on Units 3,4,5
- 20-35% reduction in NOx, process control and ductwork modifications
- No ammonia usage, storage, or slippage

SNCR (Selective Non-Catalytic Reduction)
- 25-35% reduction in NOx
- Uses ammonia (3-4 trucks/week)
- Ammonia slip issue

NOx Control Alternatives

SACR (Selective Auto-Catalytic Reduction)

- Upto 70% reduction of NOx
- Requires on-site natural gas or propane supply
- Require ammonia deliveries and storag

SCR (Selective Catalytic Reduction)

- Upto 95% reduction of NOx
- Space constraint
- Requires ammonia deliveries and storage
- Ammonia slippage issue
- High Capital cost

Legislative Attempts

Achieve City's objectives through introduction of State legislation "Clean Smoke Stacks Bill" in 2004

- Modeled after North Carolina Bill that ted Duke Energy and forced BACT.
- Tighter than federal regulations.
- The Bill has been carried over. Possibility o reintroduction in 2005 session.
- Proposed 75% NOx reductions from 1997 level
- Proposed 75% SOx reduction from levels permi by Acid Deposition Control Rules
- Proposed "No trading" to achieve above reductio
- Compliance date 2009 (2014 with consent decree t cease operations by that date)

Staff's recommendations

- Short term Actions:

PM2.5 and NOx

- Support operating permit/ consent der requiring SOFA on unit 3,4, and 5, and
- Phase out of Unit 1 and 2,
- Alternatively, SOFA on Units 1 to 5
- Oppose control technologies that requires ammonia for controls.
- Oppose control technologies that will require major upgrades that will prolong the useful life the plant.
- Support CAP and "No Trading" for summertime This will require minimizing the production during summer.

Staff's recommendations

- Short term Actions:

Fugitive Dust / PM 10

- Support additional controls at fly-ash handling facility to address fugitive dust issues.
- Improvements to Coal and Ash Handling fa
- Fund supplement environmental projects as p penalties paid by Mirant to State for 2003 violati

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Staff's recommendations

- Long Term Actions:
  - Support and Track state and federal legislation
  - Support phase out of the plant.
  - Continue to engage state and federal regula concerning enforcement issues related to Mir
  - Support installation of Mercury Emissions Cont

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Mirant's Operating Permit

Mirant Operating Permit limiting summertime NO emissions is currently out for public comments

Public hearing is scheduled for
Date: Monday, April 12, 2004
Location: Lee Center

Permit as proposed does <u>not</u> allow trading

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TRI Data and Purpose

- Emergency Planning and Community Right to Know Act (EPCRA)
- The law requires industrial facilities such as electric utilities report annually on their releases of chemic
- The reports contain information about the types amounts of toxic chemicals that are released eac air, water, and land. Toxics Release Inventory (TRI), database that tracks nearly 650 chemicals released
- Ease public access to environmental information

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TRI Data

- In 1997, expanded to include electric power industry: 1st report due by Mirant in 1999.
- Not all chemical releases are regulated, TRI D NOT ASSESS RISK
- Mercury compounds are required to be reported
- Solely, because of Mirant's releases, 2002 TRI data (to released in April) will show the City being ranked 9th in Commonwealth of Virginia.

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Questions???

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