

## MARAMA PM2.5 CEM Webinar

Pennsylvania's Perspective

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## Description of PM Continuous Monitoring Technology Experience

### Type of Technology

- Series 7000 Tapered Elemental Oscillating Microbalance (TEOM 7000) Source Particulate Monitor used to monitor in-stack PM concentrations.
- Installed for a limited test period to correlate opacity as measured by a permanently installed Continuous Opacity Monitor (COMS) and PM concentration .
- Test was performed to address the requirements of 40 CFR Part 64-Compliance Assurance Monitoring (CAM)

### Date Installed

- Continuous Sampling Test period was accomplished on April 6, 2006, 07:57 EDT-13:29 EDT

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## Description of PM Continuous Monitoring Technology Experience (Cont'd)

### Industry/Source

- 520 MW waste coal fired power plant with two circulating fluidized bed (CFB) boilers.
- Limestone injection for SO2 control
- SNCR for NOx control
- Baghouse for particulate control
- Fly ash absorber upstream of the baghouse

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## Opacity and Particulate Matter Sampling Program

### Opacity Monitoring

The Continuous Opacity Monitor was operated and calibrated daily in accordance with established PADEP guidance.

### Particulate Monitoring

- Continuous PM sampling was conducted using the TEOM 7000 at the common stack circular flu serving both units
- Test ports were located using Referenced Method 1 criteria
- A single sampling point of average gas stream velocity based on on historical gas stream velocity profile
- The TEOM 7000 maintained isokinetic sampling between 0.90-1.10

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## Sampling Program Results

Unit	Predicted PM10 Concentration and 99.9 Percent Confidence Interval for Opacity Observation = 25%	Ratio of 99.9 Percent Interval to Predicted PM Concentration (%)
Nos. 1 and 2 (common stack)	0.038 ± 0.005 gr/scf	11.8%

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## Analysis of Test Data

- Summary of results of calculations at various selected opacities at low and high %(w) CO2 concentrations:

Opacity (%)	Unit Nos. 1 and 2 Common Exhaust Stack Calculated PM10 (lb/MMBtu) @ 10% CO <sub>2</sub> (w)	Unit Nos. 1 and 2 Common Exhaust Stack Calculated PM10 (lb/MMBtu) @ 14% CO <sub>2</sub> (w)
5.0	0.007	0.005
5.5	0.009	0.006
6.0	0.010	0.007
6.5	0.011	0.008
7.0	0.013	0.009
7.5	0.014	0.010
8.0	0.016	0.011

- PM and Opacity Standards
- Predicted PM standard was established at 10% below the PM permit limit of 0.10 lb/MMBtu or 0.009 lb/MMBTU
- Opacity Standard is not to exceed 10% for periods aggregating more than 3 minute in one hour or equal or greater than 30% at any time
- An Opacity Action Procedure was set at 5% opacity

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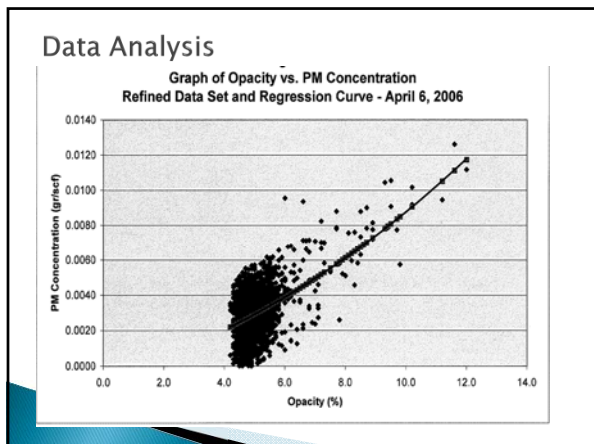
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- ### PA DEP LESSONS LEARNED
- ▶ There is a near-linear relationship between opacity and PM up to 25% opacity
  - ▶ Other minor variables besides opacity influencing PM concentration were not considered
  - ▶ Most of the data in the ranges measured were between 0 and 6 percent opacity
  - ▶ This demonstration is limited to the application of CAM "to provide a reasonable assurance of compliance with emission limitations or standards for the anticipated range of operations at a pollutant specific emission unit" limit and not for compliance demonstration

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