

**Center for Agricultural Air Quality Engineering and Science**

**Texas A&M University**

**College Station, Texas**

# **Air Quality Research**

**USDA AAQTF Meeting**

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**Bryan W. Shaw, Ph.D.**

**Associate Director**

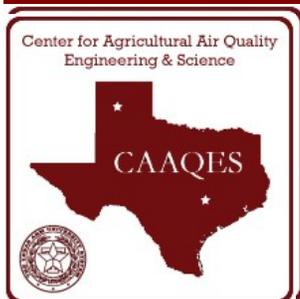
**Center for Agricultural Air Quality**

**Engineering and Science**

**Biological and Agricultural Engineering Department**

**Texas A&M University**

**College Station, Texas**



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# Buckeye Egg - Ohio

Center for Agricultural Air Quality  
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# “Clean Air Act Settlement”

- 2-23-2004 Consent Decree
  - \$880,598 Civil Penalty
  - \$1.4 million – installation and testing of innovative controls for PM & NH<sub>3</sub>
  - Based on failure “to obtain necessary air permits” – Title V and PSD
  - 3 facilities

# Title V and PSD Permits

- Title V Permit – Emission threshold
  - 100 tons per year (tpy)  $PM_{10}$  (in attainment area)
- PSD Permit – Emission threshold
  - 250 tpy  $PM_{10}$

# Buckeye Consent Decree

- Allegations based on preliminary emission estimates for 3 facilities required by EPA
  - 550, 600, and over 700 tpy
  - However, these were Total Suspended Particulate (TSP) values
- Title V and PSD thresholds are based on  $PM_{10}$  not TSP

# PM<sub>10</sub> versus TSP

- Title V and PSD
  - TSP not regulated
  - Should TSP be used as surrogate?
  - Ohio EPA – Does not use TSP
- In Buckeye case, use of TSP was inappropriate!
- Some at EPA suggesting that it may be appropriate to use TSP as indicator for PSD

# PM<sub>10</sub> versus TSP

- EPA guidance: may be appropriate to use TSP for NSPS
  - TSP not regulated
  - TSP used as surrogate with values developed to address PM<sub>10</sub>
  - Sources involved emit mostly PM<sub>10</sub>  
e.g., terminal export grain elevators

# PM<sub>10</sub> versus TSP

- Why not use TSP as surrogate for PSD?
  - Emission of 250 tpy TSP from typical stack source is about 250 tpy PM<sub>10</sub>
  - Emission of 250 tpy TSP from source of large PM (layer) is about 25 tpy PM<sub>10</sub>
- These two sources do not have the same potential impact on PM<sub>10</sub> levels in the area of concern!

# Issues with Croton Data

- Same frozen egg problem as Marseille site with assumption that fans run 8760 hours per year
- Numbers from EPA letter to Buckeye project annual an emission of 272 tpy not the 550 tpy in EPA press releases
- Particle size analysis from Croton suggests Mass Median Diameters of 1 and 3 microns for Layer Sites 2 and 4, respectfully

# PSD Data is Wrong!

- Broiler Data (Lacey) – MMD  $\sim$  24 microns
- Mechanically generated dusts tend to be much, much larger
- Marseille data suggests MMD  $\sim$ 30 microns
  - $\sim$  Less than 4% < 5 microns
  - $\sim$  Less than 0.1% < 1 microns

# Croton PM<sub>10</sub> Emission

- If PSD similar to Marseille, correcting for size and using MWPS ventilation rates:
  - Annual TSP ~ 130 tpy
  - Annual PM<sub>10</sub> ~ 13 tpy

# Conclusions

- Facilities did NOT need Title V and PSD permits
- TSP should not be used to require PSD permits with sources of large particles
  - i.e., TSP  $\neq$  PM<sub>10</sub>

**Thank you!**

# Data Analysis

- We have obtained the contractors' report for the Marseilles facility (EPA estimated 740 tpy PM)
- Comparison to broiler operation
  - Laying operations could be expected to have lower emissions than broiler operations
  - Broiler emission factor ( $PM_{10}$ ) – 26.5 mg/bird/day (Lacey et al, 2003)
  - Marseilles facility – 16 houses @ 207,000 birds/house – 35 tpy  $PM_{10}$  <<< 740 tpy

# Flow Rate Controversy

- Calculated annual emissions directly proportional to estimated flow rate
- Contractor measured and used 6,300 cfm per fan – 365,000 cfm/house
- EPA required the contractor to use ~14,000 cfm/fan – 811,000 cfm/house
- Both used  $2.17 \times 10^{-7}$  lb/dscf
- EPA used 811,000 cfm/house, 24 hours per day, 365 days per year to get 740 tpy

# Flow Rate Continued

- Operational limits would not allow operations at these flow rates
  - On cold days birds would die from exposure if fans were operated as EPA calculated
  - MWPS, 1990 – recommended ventilation rates for cold, mild, and hot days used to estimate operational limits
  - National Weather Service Data for 2003 used to estimate number of cold, mild, and hot days at Marseilles location

# Meteorological Statistics

## Columbus, Ohio 2003

Cold days <55 F	Mild days $55 < T < 70$	Hot days >70
193	108	64

# Potential to Emit

- Permit thresholds are based on a facilities potential to emit under physical or operational design

# PM<sub>10</sub> versus TSP

- EPA contractor reported particle size distributions (PSD) of the PM measured
- CAAQES personnel fit the data to lognormal distribution to obtain PSD parameters
  - Mass Median Diameter (MMD) – 30 microns (AED)
  - Geometric Standard Deviation (GSD) – 2.35 microns
  - PSD used to determine fraction less than 10 microns

# Mass Percent less than 10 microns - PM<sub>10</sub>

MMD = 25 micron AED GSD = 2.35	14
MMD = 30 micron AED GSD = 2.35	9.9
MMD = 35 micron AED GSD = 2.35	7.1
MMD = 24 micron AED GSD = 1.6 (Lacey)	3.1

# Scenarios

- 1 – 207,000 birds/house, flow rates of 0.4, 2, and 5 cfm/bird were used (cold, mild, & hot conditions)
- 2 – Same as 1 except 6 cfm/bird during hot conditions
- 3 – Same as 1 except 173,000 birds/house

# Annual PM Emissions

CAAQES Scenarios	TSP (TPY)	Calculated PM <sub>10</sub> Emissions (TPY)			
		MMD= 25 GSD=2.3	MMD= 24 GSD=1.6 (Lacey et al.)	MMD= 30 GSD=2.3	MMD=35 GSD=2.3
1	317	44	10	31	22
2	350	49	11	35	25
3	265	37	8	26	19
Consultant's Report	325	45	10	32	23
EPA	737	103	23	73	52

# Conclusions

- It appears that EPA made significant errors in calculating/applying  $PM_{10}$  emissions to the Marseilles facility
- Based on our calculations, Title V and PSD permits were not required

# Conclusions

- Though the facility had a history of contempt charges for failure to comply with a state Consent Order, that does not justify inappropriate application of Title V and PSD permitting requirements
- The precedent of requiring Title V and PSD permits based upon erroneous emission calculations is likely to impact other agricultural stationary sources

# Conclusions

- This demonstrates a lack of understanding of agricultural production by EPA personnel and contractors and a lack of regard for fair play in regulating air emissions