

# Experiences with Wet Test Methods for Formaldehyde

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<http://www.dep.state.pa.us/dep/deputate/airwaste/aq/source/sts.htm>

# Brief History of Wet Test Methods

- 1990 EPA Method (EPA/600/3-90/005)
  - Constant Rate Sampling; DNPH
- 1991 BIF Method 0011 (SW-846)
  - Isokinetic Sampling; DNPH (opt. breakthrough check)
- NCASI Chilled Impinger Methods
  - Constant Rate Sampling (400±50 cc/min); Water
    - CI/SG/PULP-94.02 (for pulp & paper mills)
      - No filter; 2 Impingers, first empty
    - CI/WP-98.01 (for wood products mills)
      - Hot probe/filter; two impingers
    - IM/CAN/WP-99.01 (for wood products mills)
      - Hot probe/filter; 3 Impingers, first with glass frit
  - EPA Method 301 Validation

# Allegheny Particleboard Tests

- 06/94 1990 EPA Method (constant rate)
- 08/94 BIF Method 0011 (isokinetic)
  - Board Press & Cooler results were substantially lower
- Why were the results so different?
  - Process Variability?
  - Difference in Sampling Rate?
  - Breakthrough, despite unreacted DNPH?

# Yorktowne Department Tests

- Waste Wood-Fired Boilers w/common stack
  - 5 MMBtu/hour heat input (per unit)
  - Cyclones used for particulate control
- 07/96 BIF Method 0011
  - 2 impingers, each with 150 mL of DNPH
  - 31.6% of CH<sub>2</sub>O in last impinger; probable breakthrough
- 10/96 BIF Method 0011
  - 4 impingers, each with 150 mL of DNPH
  - 0.1% of CH<sub>2</sub>O in last impinger; no breakthrough
  - Mass emission rate was 2.7x higher
  - CH<sub>2</sub>O emissions much higher than AP-42 Factor
    - 2 lbs/ton versus 0.019 lbs/ton (assuming HHV of 8500 btu/lb)

# Wood-Mode Department Tests

- Virgin or Waste Wood-Fired Boiler
  - 30MMBtu/hour heat input
  - Cyclone used for particulate control
- 08/96 BIF Method 0011
  - 4 impingers, each with 150 mL of DNPH
  - 0.1% of CH<sub>2</sub>O in last impinger; no breakthrough
  - Fuel had no appreciable impact on CH<sub>2</sub>O emissions
    - Some aldehyde emissions increased for waste wood
  - CH<sub>2</sub>O emissions much higher than AP-42 Factor
    - 5 lbs/ton versus 0.019 lbs/ton (assuming HHV of 8500 btu/lb)

# Testing at MDF Plants (BIF Method 0011)

- 10/97 Allegheny MDF
  - 57.3% of formaldehyde in last (2<sup>nd</sup>) impinger
  - Probable breakthrough
- 11/97 MacMillan Bloedel Clarion
  - 4.4% of formaldehyde in last (3<sup>rd</sup>) impinger
  - No breakthrough

# Testing at MDF Plants (NCASI Method CI/WP-98.01)

- 12/98 Masonite Corporation
  - 2-58% of formaldehyde in last (2<sup>nd</sup>) impinger
    - 10% for Die Form Press
    - 38% for Resin Blender
    - 46% for Felter Scrubber
    - 58% for Board Cooler
    - 46% for First Stage Dryer
    - 2% for Second Stage Dryer
  - Probable breakthrough when sampled at 650 cc/min

# Testing at MDF Plants (Method 25C vs. Method 25A)

- Misreporting or Underreporting
  - Non-Simultaneous Testing at Two Facilities with Similar Production Capacity
  - Results from one facility appeared to be twice as high as from the other facility
  - Why were the results so different?
    - Reporting Issues
    - Differences in Operating Conditions



# Issues of Concern

- Do the various test methods produce data that is comparable?
- If the test methods are not comparable, how does one decide which procedure is appropriate?
- Is breakthrough a problem?
- Is formaldehyde being accounted for?
- Would audit samples help validate the data?

Questions or Comments?