Operation of Continuous
PM2.5 Best Practices

One Agency’s Trials and Successes
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- Operates a monitoring network in 4 counties in Southwest Ohio
- Current continuous PM2.5 network
  - 3 MetOne BAM
    - 1 FEM-Ncore
  - 3 Thermo SHARP
  - 1 TEOM with FDMS
Continuous PM2.5 Monitoring Network

PARTICULATE POLLUTION
Reading Date: 08/18/2011 12 noon
(Based on rolling 24-hr average)

- Very unhealthy
- Unhealthy
- Unhealthy for sensitive groups
- Moderate
- Good
- No data

Monitoring Sites

ILCARD, Ohio University, 2011
Earlier continuous network

- 3 TEOMs
  - FDMS added
  - Staff training
  - Dryer refurbishment
    - Result of early work of state of Wisconsin, attempted to replace dryers annually

- 2 BAMs
  - RH Set point Adjustments

- 1 SHARP side by side with BAM
  - Special Study
Installation of BAM 1020 FEM

- Operational Issues
  - Fibers
  - Pin holes
  - Flow
  - Change from standard cycle to early cycle mode
  - Grounding of instrument
  - Using new correction factor

- Issues resulted in 5 months of invalid data
Next Steps

- Worked with Vendor to correct operational issues
- As problems corrected, comparability between FRM and FEM improved
- Result of these discussions lead to development of a maintenance schedule
Work groups formed

- BAM – October 2011
- SHARP – December 2011
- TEOM – March 2012
Sources Used

- Instrument Manuals
- Standard Operating Procedures from other Monitoring Organizations
- Personal contact with other Monitoring Organizations
- Referred to Quality Assurance Handbook Volume II
FEM BAM: Major Maintenance Items

- 72 Hour Zero Background – Annual
  - Use correction factor!
- 24 Hour Zero Background Check – 6 month
- Clean Capstan, Pinch Rollers, Nozzle, & Vane - Monthly
  - Visually inspect tape weekly
- Routine leak checks/as-found checks
- Flow verification - Monthly
  - Keep within limits; +/- 4%
  - Calibrate annually or as needed
Examples of data before and after

Daily FEM-FRM Comparison

FEM-FRM difference (ug/m3) vs. Date

Chart showing daily comparisons between FEM and FRM data with dates from 1/2/11 to 3/27/12.
SHARP: Major Maintenance Items

- Multi-Point Calibration – Annual or as needed
- Review Status Report - Monthly
- Nephelometer
  - Zero – Monthly Verification
  - Clean Chamber
  - Mass Foil Calibration
Data from SHARP

Quarterly SHARP-FRM Comparison

Average SHARP-FRM difference (µg/m³)

- 1st qtr 11
- 2nd qtr 11
- 3rd qtr 11
- 4th qtr 11
- 1st qtr 12

Quarter
TEOM-FDMS Major Maintenance Items

- Filter Change Monthly
  - TEOM & FDMS
- Coalescing Bypass Filter
  - Site-Specific Changes
- Increased Leak Checks
- Dryer Refurbishment - Annual
Other Issues to Note

- Environmental Conditions
  - Room Temperature & Humidity
  - Inlet installation
- Minimize distance from instrument to pump
- Monitoring site locality may require more frequent maintenance items
- FEM/FRM collocation
Conclusion

- FEM spurred the whole program
- TEOM maintenance program still in progress
- Many issues have been eliminated or reduced
- Scheduled maintenance has improved data quality
- Whole PM maintenance schedule still in evaluation phase
  - Service schedules are “fluid”
    - Periodic reevaluation is expected
Thank you!

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