Operation of Continuous PM2.5 Best Practices

One Agency's Trials and Successes

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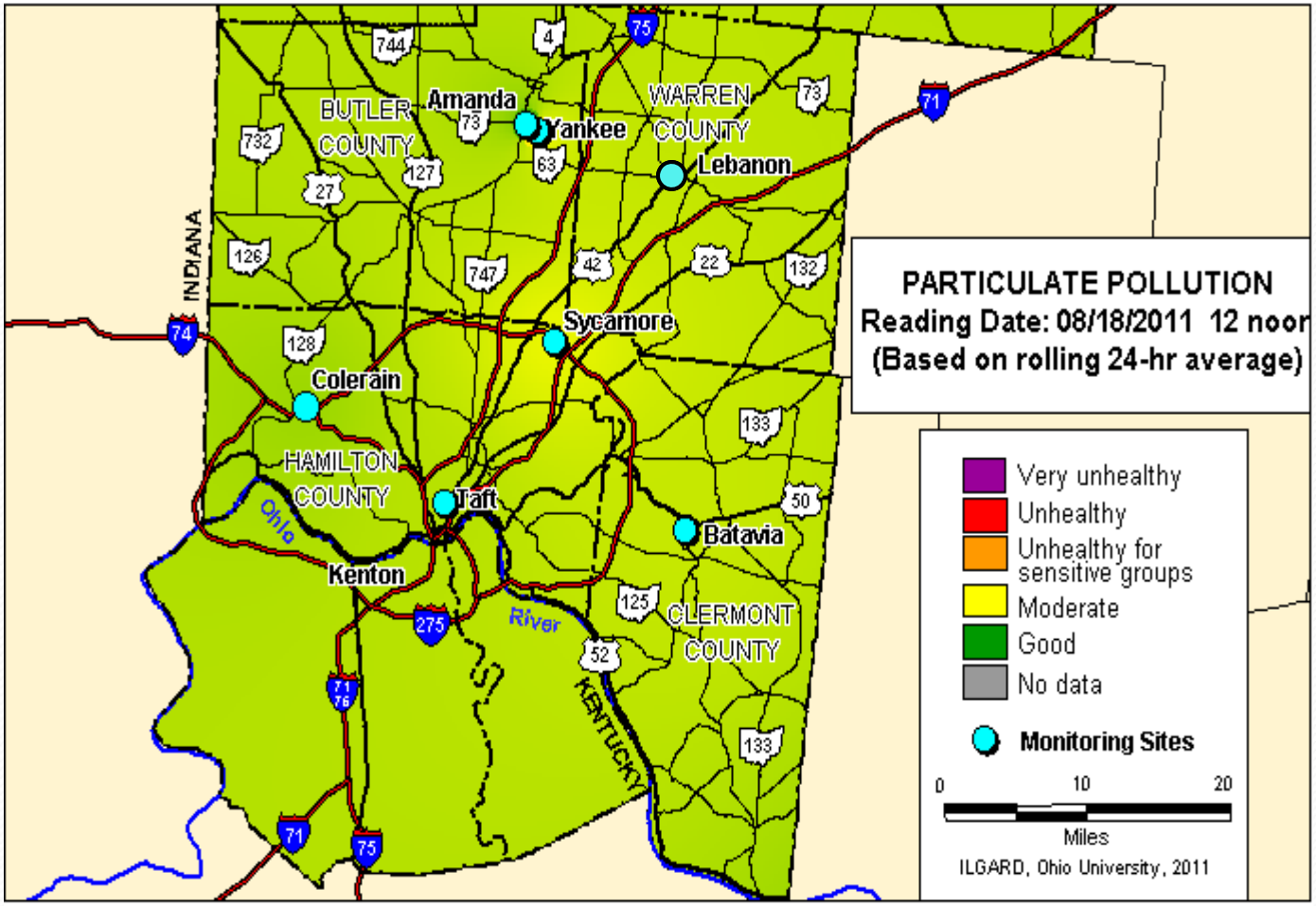
SOUTHWEST OHIO AIR QUALITY AGENCY

Southwest Ohio Air Quality Agency

a division of Hamilton County Department of Environmental Services

- 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



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

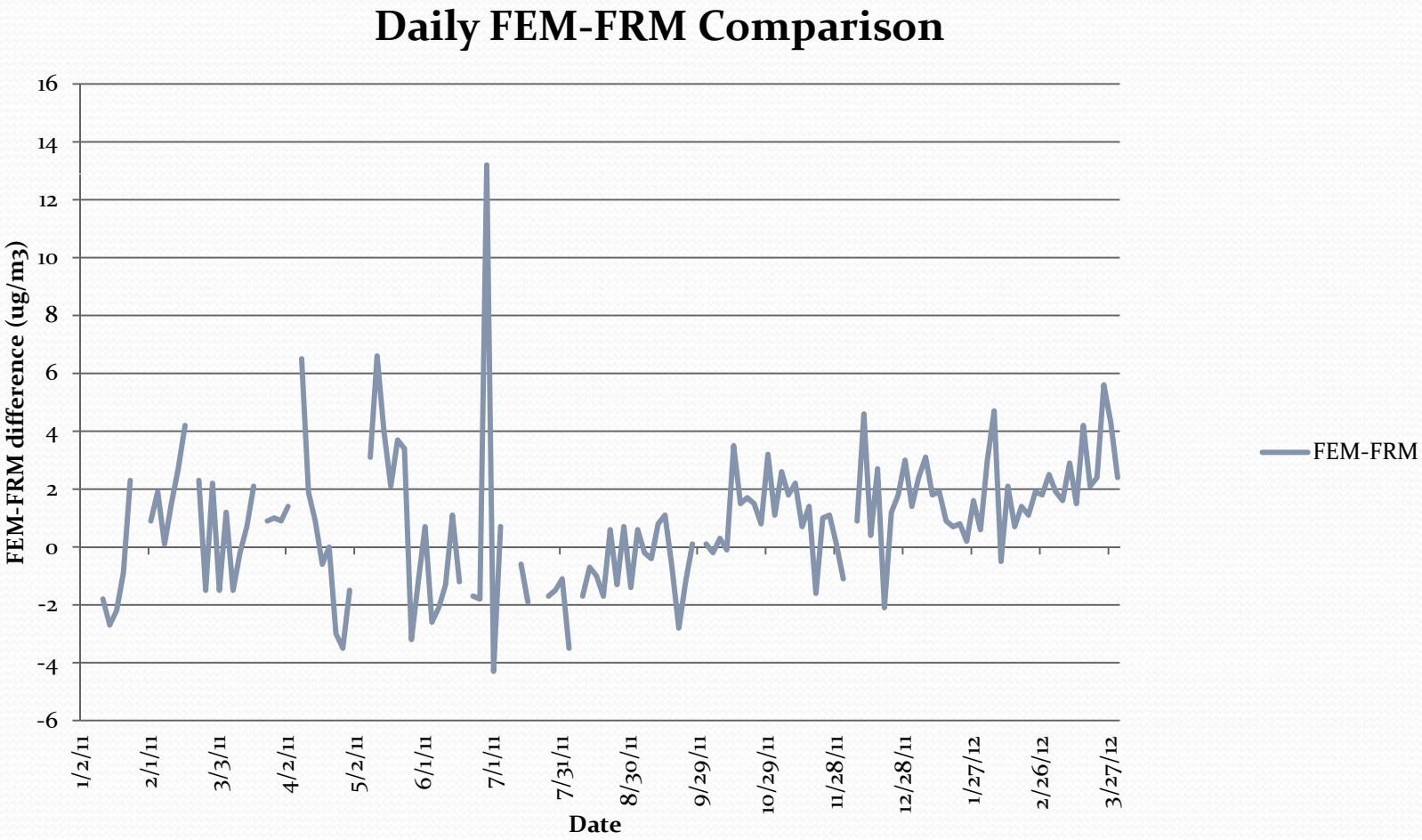
Sources Used

- 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

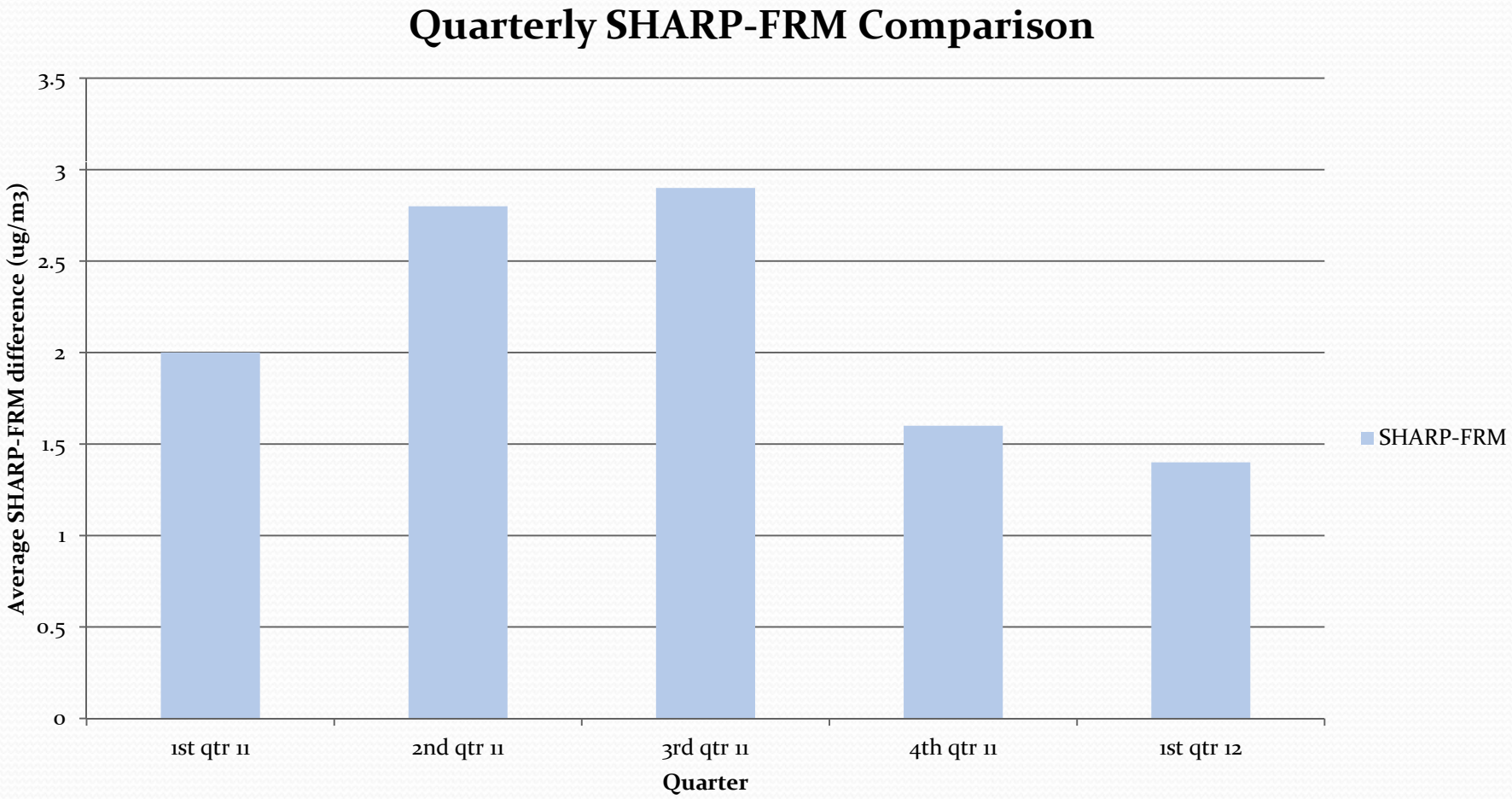
Examples of data before and after



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



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

Monitoring & Analysis Group

Thank you!

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