

PM_{finest} Quantification Issues



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Presentation Topics

- PM Measurement Philosophies
- Recent History
- Current Activities
- Future



PM Measurement Philosophies

- **Control Centric Philosophy**
 - Focuses on Stack Conditions
 - Focuses on Add on PM controls
- **Atmospheric Centric Philosophy**
 - Focuses on Post Release Conditions



Control Centric Philosophy

- **PM emissions measured at standardized stack conditions**
 - Measure only controllable component
 - “Best” controls were ESP’s & FF
 - Scrubbers were “Best” for a few sources



Control Centric Philosophy

- **NSPS/MACT emissions limitations reflect capabilities of available controls**
- **Recognized that unmeasured portion was important in ambient air**



Atmospheric Centric Philosophy

- **Emissions measurement method focuses on primary releases**
 - Measures atmospheric burden
 - Measures materials condensed due to cooling to atmospheric temperatures
 - Measures materials which quickly react to form solid particles
 - Excludes secondarily formed compounds



Recent History

- **PM-10 NAAQS**
 - Recognized condensable PM impact
 - Crustal PM was cause of most non-attainment areas
 - Condensable PM was a small consideration
 - Condensable PM method proposed in 1990
 - Was a “Consensus Method” addressing several State specific compliance test methods
 - Incorporates several analytical options



EPA Method 202

- **Collects PM in impinger water**
 - **Similar to 1971 back half PM method**
 - Nitrogen purge added
 - Changed extracting solvent
 - Added stabilization of Sulfuric Acid
 - **Reflected several State/local methods**
 - **Allowed several options**
 - Air purge
 - No purge
 - Analysis of some components



Method 202 (cont)

- **Several Consultants have proposed “better” methods**
 - Most methods are based on construct of what components should be considered “condensable PM”
 - No comparison to a Referee Method which replicates atmospheric physics



Method 202 (cont)

- **Intent is to replicate ambient air emissions**
 - PM is defined by the conditions
 - Temperature
 - Pressure
 - All M202 options generate different emissions values
 - Referee Method only recently available

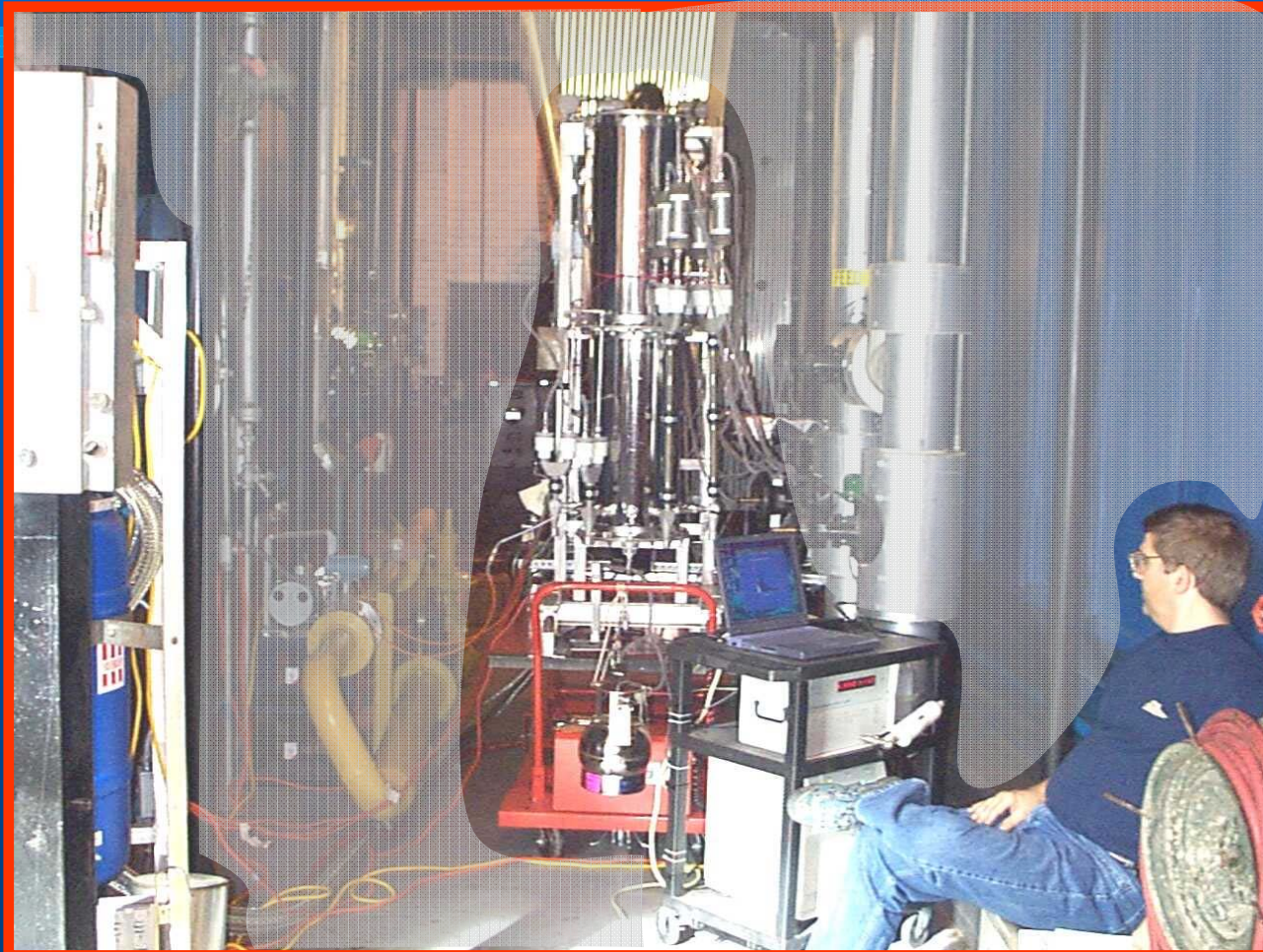


Current Activities

- **Dilution Sampling for PM**
 - Research Methods
 - OAQPS developed Method
 - Industry developed Method
 - ASTM consensus standard



Typical Research Test Method



OAQPS Dilution Sampling System

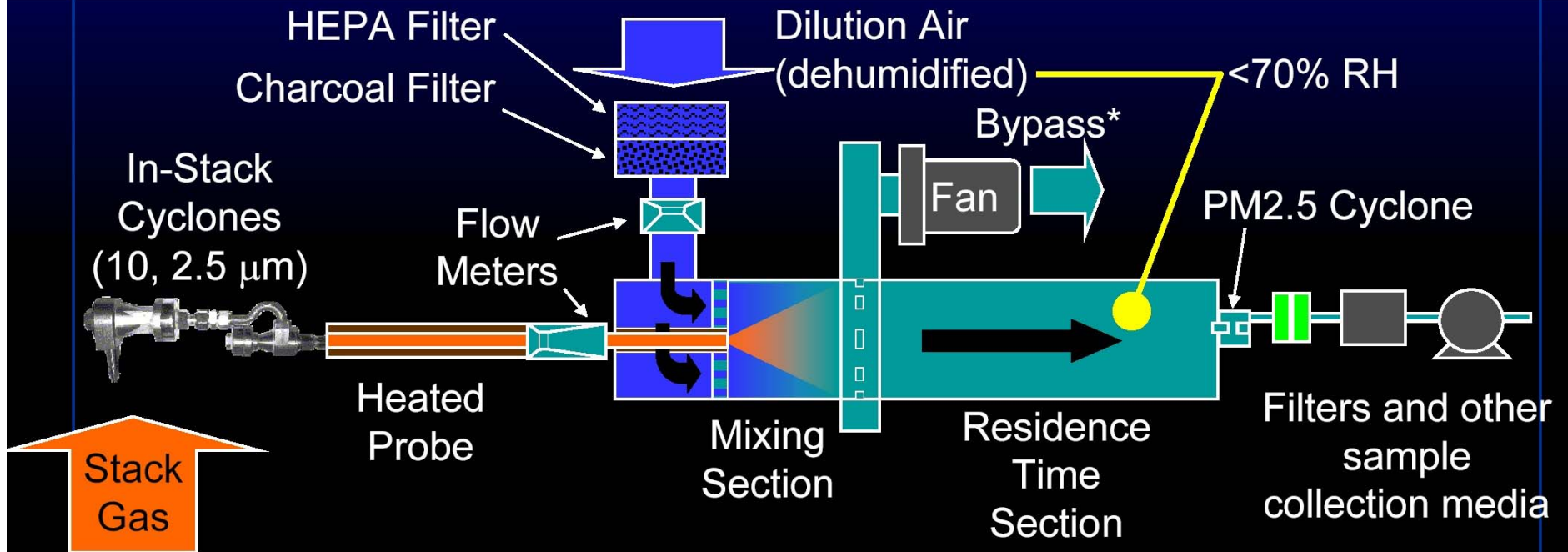


OAQPS Dilution Sampling System



New EER Field-Portable Dilution Sampler

Environmental Energy



*to maintain constant residence time at different dilution ratios)

- **Stainless steel**
- **Parallel jet mixing**
- **Dilution Ratio 20:1 (10-40:1)**
- **Residence time 10 sec**
- **Similar conditions to plume**
- **No liquid phase conversion artifacts**
- **Analytical resolution 1 μg (0.000001 g)**
- **Results comparable to**
 - **ambient air measurements**
 - **Data legacy of Hildemann design**

ASTM PM Test Method

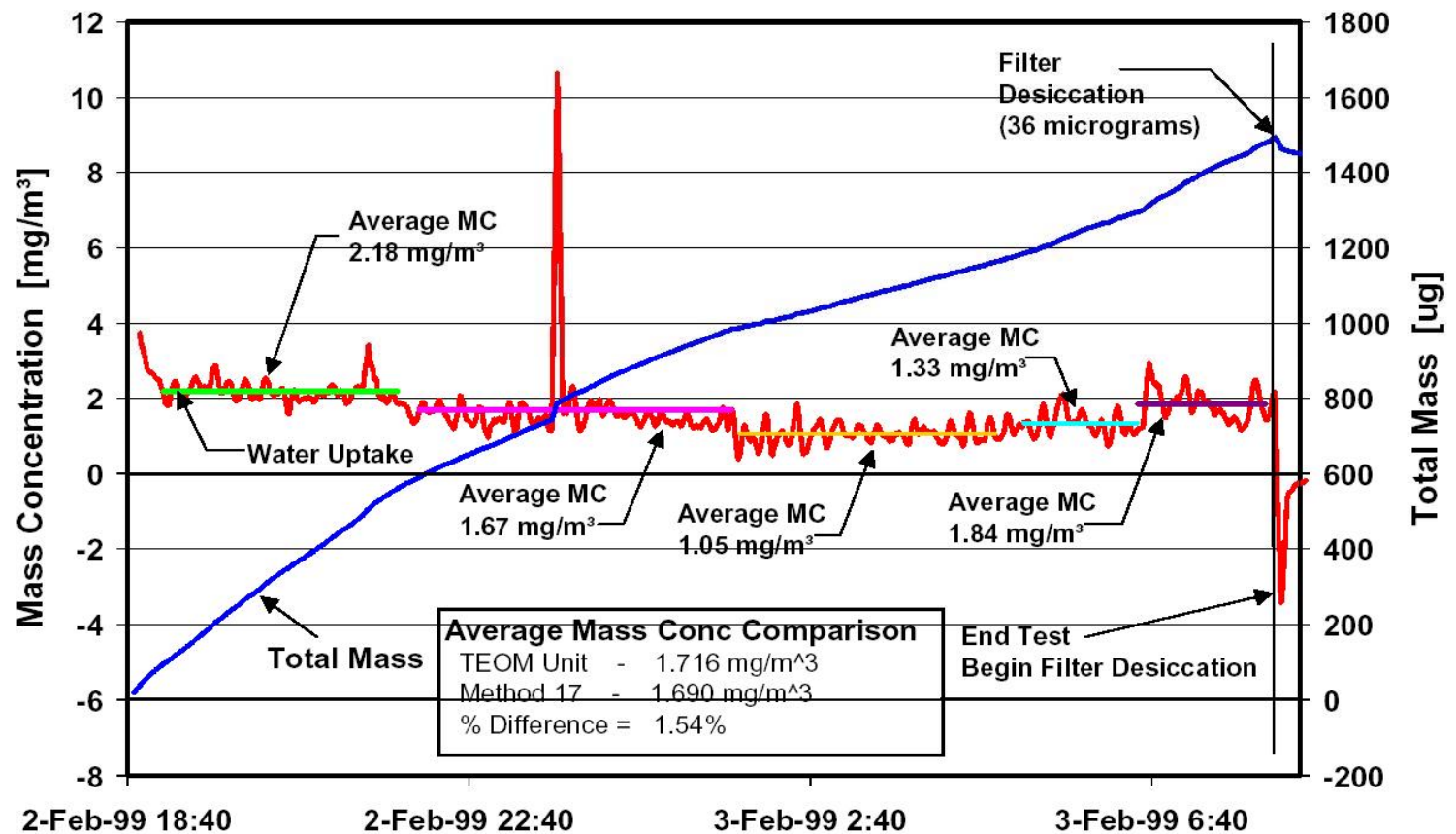
- **ASTM D22 Committee**

- Draft dilution base standard for sampling and analysis of PM_{2.5}
- Several technical issues identified with first approval ballot
- **Committee**
 - Glenn England – Chairperson
 - Representation from EPA, State/local agencies and Industry



Fine PM CEM's Development

Figure 8. Low Contration Emission Test Using Dilution with Comparison to Manual In-Stack Method



Measurement/Monitoring Drivers

- **PM fines NAAQS**
 - Ambient Air Speciation Data
 - Proposed Implementation Rule
- **Permits Program**
 - NSR/PSD
 - Title V
 - State Programs
- **Enhanced Monitoring**
- **Consolidated Emissions Reporting Rule**



PM fine Implementation Proposal

- **Published on November 1, 2005**
 - **Source Emissions Testing**
 - PM sizing at 2.5 μM
 - PM condensable
 - **Source Emissions Monitoring**
 - Filterable & condensable PM
 - Precursor compounds



PM fine Implementation Proposal

- **Source Emissions & Testing Issues**
- **Seeks Comments on:**
 - **Need for Change in Test Method**
 - **Options Available for Compliance Demonstration**
 - **Effects on Existing SIP Emissions Limits**



PM fine Implementation Proposal

- **Source Emissions Monitoring**
 - **Seeks comments on**
 - Assertion that Emissions Reduced with Improved Monitoring
 - Feasibility of co-pollutant control
 - **Asks for**
 - Examples of improved monitoring
 - Methods of determining reductions



Future

- **PM condensables are increasingly important**
- **Several methods are available to accurately quantify condensable PM**
- **Several CPM control technologies available**



Open Discussion

- **QUESTIONS?**

