Particulate Matter Overview: Supplement to the Emission Inventory Guidance for Pollutant Reporting CY2013

WV Department of Environmental Protection

Division of Air Quality, Emissions Inventory

December 2013

Particulate Matter

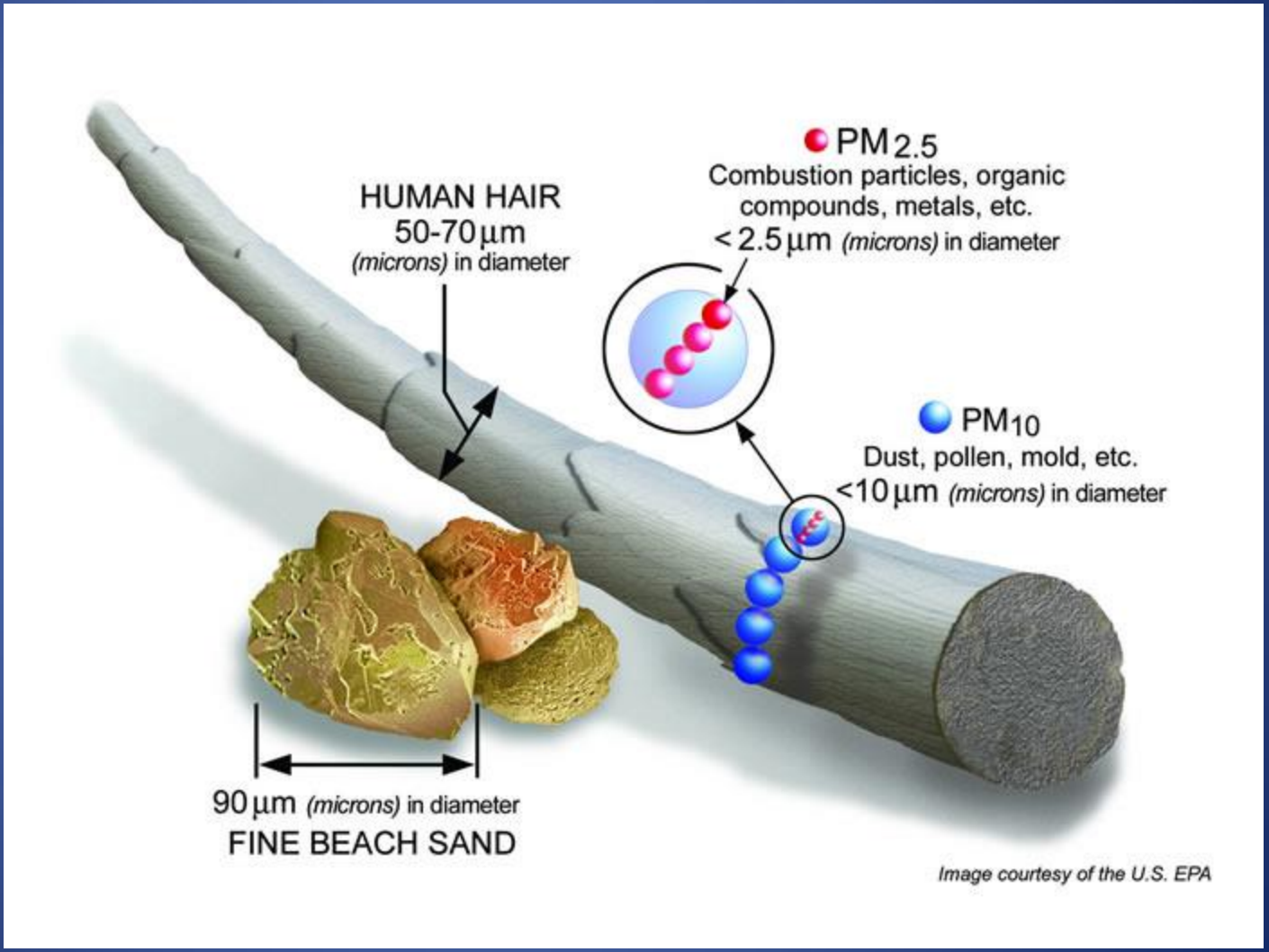
- Particulate matter (PM) consists of solid particles and liquid droplets found in the air. These particles come in many sizes and shapes and can be made up of hundreds of different chemicals. Individually, they are invisible to the naked eye. Collectively, they can appear as clouds or a fog-like haze.
- It is convenient to categorize PM by size and particle type; primary and secondary particles.

Particulate Matter: Sizes of Interest for Reporting

PM30

PM10

PM2.5



Particle Reporting Distinction

1. Primary (PRI) – Primary particles emitted directly into the air from a source.
   - Includes filterable **and** condensable components.

2. Filterable (FIL) – Filterable particles include any particulate matter that may be physically captured on a filter during sampling.

3. Condensable (CON) – The matter in the gas phase, which condenses to sub-micron particles after cooling.
   - All condensable PM is smaller than 2.5 microns in diameter, so PM-CON represents condensable matter for PM, PM10, and PM2.5.

Further Note on Condensable Matter

- Combustion, metallurgical & wood product sources emit large quantities of vapors that condense to form $PM_{2.5}$.
  - Acids (e.g., sulfuric acid from coal combustion)
  - Neutralized acids (e.g., $[NH_4]_2[SO_4]$, NH_4Cl)
  - Organic materials (e.g., alkanes, PAHs, PCBs, PCDDs, acids)
  - Metals (e.g., As, Se, Sb, Pb compounds)
- Not all sources will have condensable emissions.
- A small fraction of industrial processes are responsible for the majority of condensable PM emissions.
- However, for applicable sources the condensable fraction of direct $PM_{2.5}$ can be significant.
  - 10 to 50 percent of $PM_{2.5}$ emissions depending on control measures, temperature, other source-specific conditions.

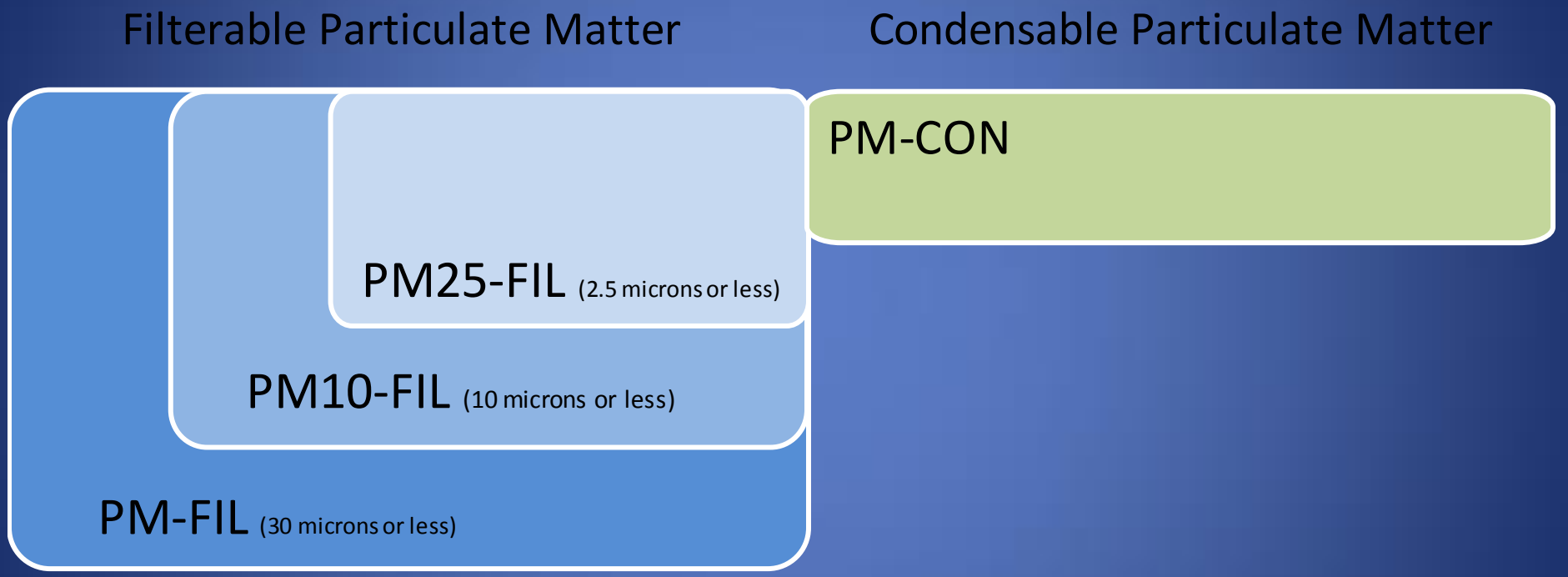
Clarification on PM Relationships, Designations, and Related Reporting

There are generally three different size ranges used for reporting PM as follows:

Size	Components by Pollutant Code (To report to WV DAQ)	Sum (Do not Report)	Historical Reference Code used in older reports
30 microns or less	**"PM-FIL" + "PM-CON " =**	PM-PRI	~~PT (Total Particulate)~~ **REPORT FIL and CON instead**
10 microns or less	**"PM10-FIL" + "PM-CON" =**	PM10-PRI	~~PM10~~ **REPORT FIL and CON instead**
2.5 microns or less	**"PM25-FIL" + "PM-CON" =**	PM2.5-PRI	~~PM2.5~~ **REPORT FIL and CON instead**

Notes: The size ranges overlap. PM10 includes PM2.5 and PM (30) includes PM 10.
PM-CON will be reported once, but could be used to result in a primary pollutant total.

A Generic View of the Overlap in the Size Ranges:



Note: size ranges above are not drawn to scale

Four Fractions of PM Must be Reported

1. PM- Filterable (PM-FIL)

   Filterable particulate matter less than or equal to 30 microns in diameter.

2. PM_{10}-Filterable (PM10-FIL)

   Filterable particulate matter less than or equal to 10 microns in diameter.

3. $PM_{2.5}$-Filterable (PM25-FIL)

   Filterable particulate matter less than or equal to 2.5 microns in diameter.

4. PM-Condensable (PM-CON)

   Condensable particulate matter; that matter which exists as a vapor at stack conditions but exists as a liquid or a solid after exiting the stack and being cooled by ambient conditions.

Measuring PM from Stationary Sources Filterable PM_{10} and $PM_{2.5}$ and Condensable Particulate

- On December 1, 2010, EPA revised two test methods for measuring PM emissions from stationary sources.
  - Method 201A
  - Method 202

Click here to view EPA's Fact Sheet on these revisions or visit: http://www.epa.gov/ttn/caaa/t1/fact_sheets/fine_pm_rules_fs_12110.pdf

Reporting to the WV Emissions Inventory

Report only the pollutant code names below (no primary PM) :

PM-FIL (30 microns and less)

PM10-FIL

PM25-FIL

PM-CON

How To Submit Data

- The WV DAQ will use its State and Local Emissions Inventory System (SLEIS) for data collection, analysis, and reporting to the US EPA. SLEIS can be accessed by going to the DAQ's emissions inventory webpage at:

http://www.dep.wv.gov/daq/planning/inventory/Pages/default.aspx
Or by clicking here, for more information.

Questions?

Contact Dave Porter, P.E.
WV Department of Environmental Protection,
Division of Air Quality
601 57th Street, S.E.
Charleston, WV 25304
(304) 926-0499, ext. 1699
David.J.Porter@wv.gov