Air Pollution Primer

Types and sources of pollution and how we monitor for them.

Air Pollution

- Two basic forms
  - Small solid or liquid particles

    Dust, smoke, mists, fly ash
  - Gases

    Carbon monoxide, sulfur dioxide, volatile organic compounds (VOCs)

Criteria Pollutants

- **Lead** (Pb)
- **Carbon Monoxide** (CO)
- **Sulfur Dioxide** (SO_2)
- **Nitrogen Dioxide** (NO_2)
- **Ground-level Ozone** (O_3)
- **Particulate Matter** (PM)

Lead (Pb)

- ***Lead*** is a metal that pollutes the air as *particulate matter* (PM).

- Main source was vehicles burning leaded fuel.

- Greatly decreased in the air since the 1970's because gasoline, paints, and other products are no longer made with lead.

Lead - Sources

- Lead smelters, ore and metals processing
- Lead-based battery factories and recyclers
- Piston-engine aircraft operating on leaded aviation gasoline
- Polluted soil and dust
- Paint in older houses

Carbon Monoxide (CO) - Sources

- A colorless, odorless gas emitted from the burning of fuels.
- The majority of CO emissions to ambient air come from mobile sources, mainly in urban areas.
- Indoors, CO comes from fuel-burning sources, such as natural gas combustion.

SO_2

- Used as an indicator for the larger group of gaseous sulfur oxides (SO_x).

- SO_x can react with other compounds in the atmosphere to form small particles of $PM_{2.5}$ and acid rain.

Sulfur Dioxide (SO_2) - Sources

- The largest sources are from fossil fuel combustion at power plants (73%) and other industrial facilities (20%).

- Industrial processes such as extracting metal from ore, and the burning of high sulfur containing fuels by locomotives, large ships, and non-road equipment.

1935 GE Globe Top Refrigerator – Uses SO_2

Nitrogen Dioxide (NO_2)

- **NO_2 is an indicator of a group of highly reactive gasses known as "oxides of nitrogen," (NO_x).**

- **NO_2 forms quickly from the burning of fuels in cars, trucks, buses, power plants, and off-road equipment.**

- **NO_x react with ammonia, moisture, and other compounds to form small particles.**

VOCs

- Organic chemicals with a low boiling point thus are gases at room temperature.

- Float around in the atmosphere until they combine with something, such as NO_x.

VOCs

- Gasoline vapors, chemical solvents.
- In SC, most of the VOCs are biogenic in origin.

OZONE (O_3)

NO_x + VOCs + SUNLIGHT = OZONE

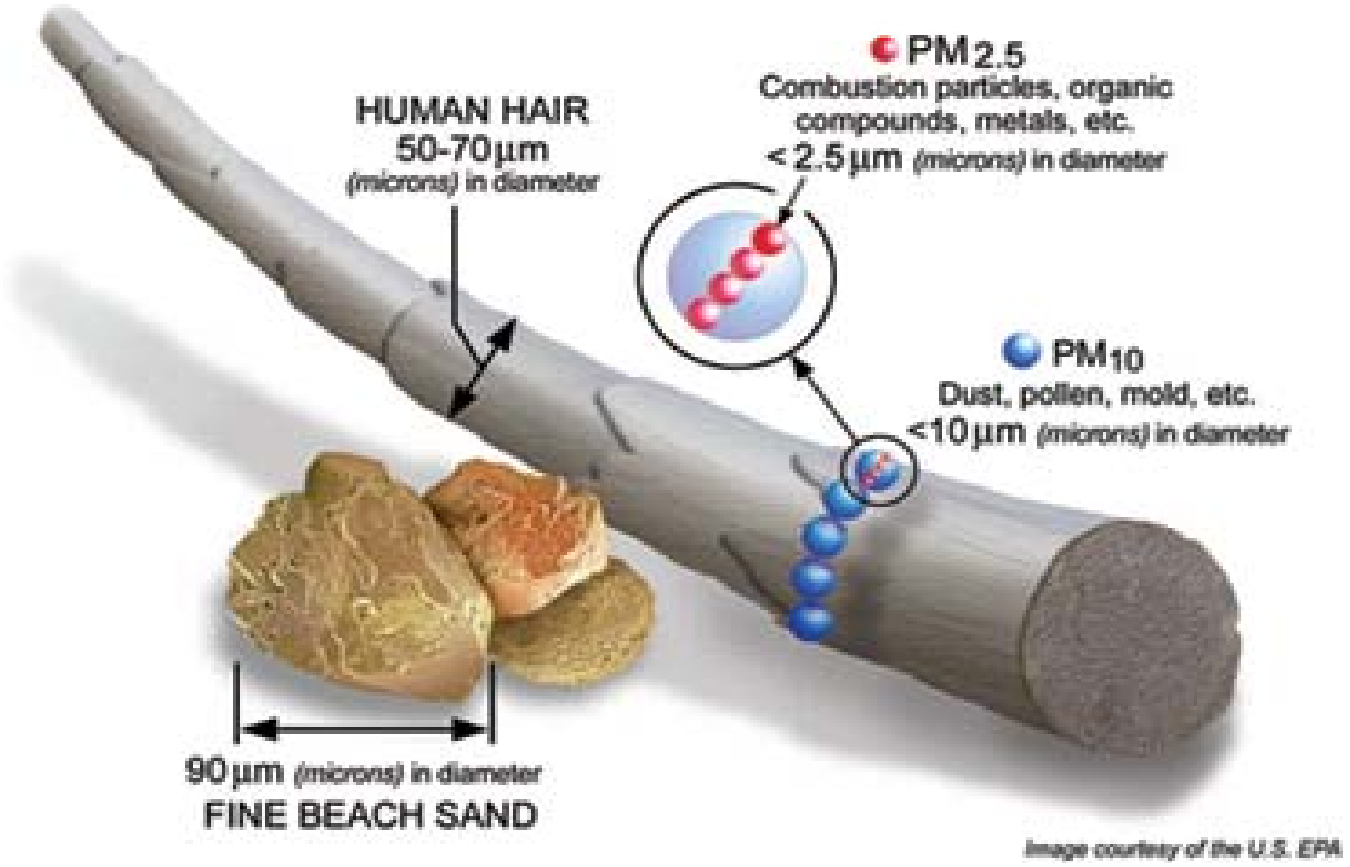
Particulate Matter (PM)

- **Solid or liquid particles. Size is directly linked to their potential for causing health problems.**

- **“Inhalable coarse particles" (such as those found near roadways and dusty industries), which are larger than 2.5 micrometers and smaller than 10 micrometers in diameter.**

- **"fine particles" (such as those found in smoke and haze), which are 2.5 micrometers in diameter and smaller.**

Particulate Matter (PM)



Particulate Matter (PM) - **Sources**

- **Fires - Burning wood, trash, and yard trimmings**
- **Industry smoke stacks**
- **Construction dust; windblown soil or sand**
- **Diesel engines, such as semi-trucks and buses**

When it comes to the air we breathe...

Open burning is not worth the risk.

Open Burning

Know the Facts. Know the Laws.

Know the Risks.

scdhec.gov/baq

South Carolina Department of Health and Environmental Control