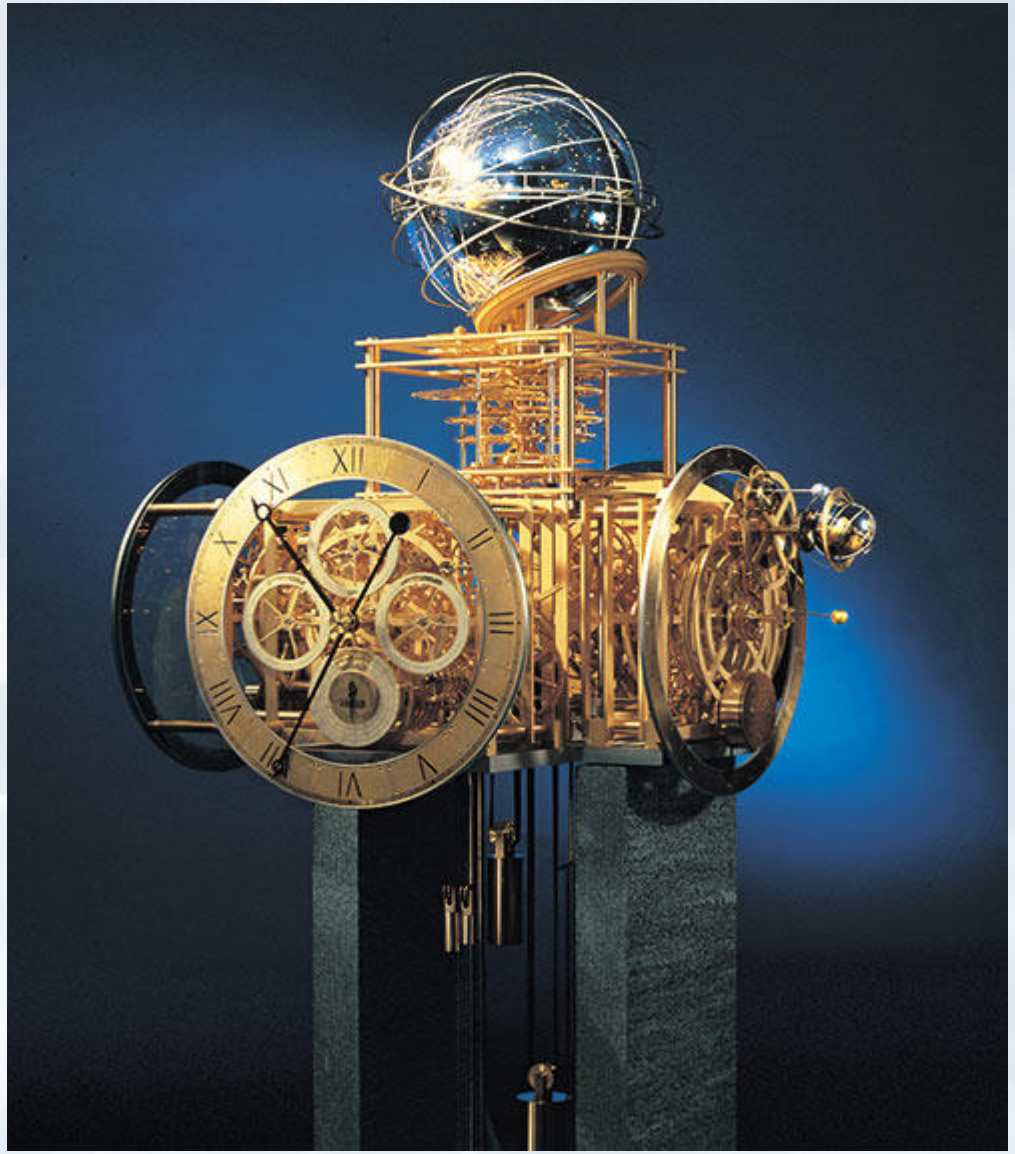
District Portable Instrumentation Overview

Board of Directors
Santa Barbara County
Air Pollution Control District

Our Mission: To protect the people and the environment of Santa Barbara County from the effects of air pollution.

Aeron Arlin Genet
Director / APCO

Sage Swain, Air Quality Specialist &
Jake Canney, Air Quality Specialist
October 17, 2019



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Overview

- Introduction
- Compliance Instrumentation
  - Toxic Vapor Analyzer
  - Testo 350 XL Combustion and Emissions Analyzer
  - MicroPHAZIR AS Handheld Asbestos Analyzer
  - Jerome J-605 Hydrogen Sulfide Analyzer
  - MIE pDR-1500 Personal Aerosol Monitor
- Air Monitoring Instrumentation
  - E-BAM
  - Airpointer

Toxic Vapor Analyzer

Operation

- Measures total hydrocarbons and other compounds in the atmosphere and displays the results in parts per million (ppm)

- Flame Ionization Detector – measures total hydrocarbons
  - Dynamic range of 0 - 50,000ppm

- Photo Ionization Detector – very sensitive to aromatic and chlorinated compounds and can measure inorganic compounds that the FID cannot such as ammonia, carbon disulfide, carbon tetrachloride, chloroform, ethylamine and hydrogen sulfide
  - Dynamic range of 0 – 2,000ppm

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Toxic Vapor Analyzer

District Staff Use and Applicable Rules

- Onshore and Offshore Oil and Gas Production and Storage Facilities

  Rule 331 Fugitive Emissions Inspection and Maintenance
  Rule 325 Crude Oil Production and Separation
  Rule 326 Storage of Reactive Organic Compound Liquids
  CARB's Greenhouse Gas Regulation for Oil and Gas Facilities

- Municipal Solid Waste Facilities

  CARB's Landfill Regulation

- Contaminated Soil Clean-Ups

  District Permit Requirements

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Testo 350 XL Combustion Emission Analyzer

Operation

- Measures specific compounds in the exhaust of combustion equipment using chemical sensors located in the measurement box
- Nitrogen Oxides (NOx)
- Carbon Monoxide (CO)
- Nitrogen Monoxide and Dioxide (NO and NO_2)
- Oxygen
- All results are given in ppm

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Testo 350 XL Combustion Emission Analyzer

District Staff Use and Applicable Rules

- Boiler, Steam Generator, Process Heater and Water Heater Inspections
  - Rule 342 Boilers, Steam Generators and Process Heaters (5 MMBtu/hr and greater)
  - Rule 360 Boilers, Steam Generators and Process Heaters (0.07 MMBtu/hr – 2 MMBtu/hr)
  - Rule 361 Boilers, Steam Generators and Process Heaters (2 MMBtu/hr – 5 MMBtu/hr)
- Internal Combustion Engine (ICE) Inspections
  - Rule 333 Control of Emissions from Reciprocating ICEs

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MicroPHAZIR AS Asbestos Analyzer

Operation

- Uses near-infrared spectroscopy to rapidly identify the six types of asbestos fibers. The result displayed is the type of asbestos fiber that can be reliably reported in the material.

Chrysotile	Tremolite
Crocidolite	Actinolite
Anthophyllite	Amosite

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MicroPHAZIR AS Asbestos Analyzer

District Staff Use and Applicable Regulation

- Asbestos related inspections and complaints

  Asbestos National Emissions Standards for Hazardous Air Pollutants

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Jerome J-605 Hydrogen Sulfide Analyzer

Operation

- Hydrogen Sulfide (H_2S) adheres to a thin gold film that results in an increase in electrical resistance proportional to the mass of the H_2S in the sample
- The sampling range is from 3 parts per billion (ppb) to 10 parts per million (ppm)
- Readings of 100 ppb or less are displayed in units of ppb and readings above 100ppb (0.100 ppm) are displayed in units of ppm

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Jerome J-605 Hydrogen Sulfide Analyzer

District Staff Use and Applicable Rules

- Enforcement of District Rule 310 Odorous Organic Sulfides
  - Rule 310 prohibits the discharge of H_2S or organic sulfides beyond the property line in excess of 0.06 ppm for an average of three minutes or 0.03 ppm for an average of an hour

- Used at facilities that may contain H_2S and during odor complaint investigations

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MIE pDR-1500

Operation

- Uses a photometric light scattering configuration to measure airborne particles including dust, smoke, fumes and mists
- Measures particles in size from 0.1 – 10 micrograms and has a range of 0.001 – 400 micrograms per cubic meter
- Results are displayed and recorded in real time and are given in total micrograms per cubic meter and the time weighted average of particulates in micrograms per cubic meter for the duration of the sample

MIE pDR-1500

District Staff Use and Applicable Rules

- Contaminated Soil Clean-Ups (CSC)
- Dust Complaints
- Rule 345 Control of Fugitive Dust from Construction and Demolition Activities

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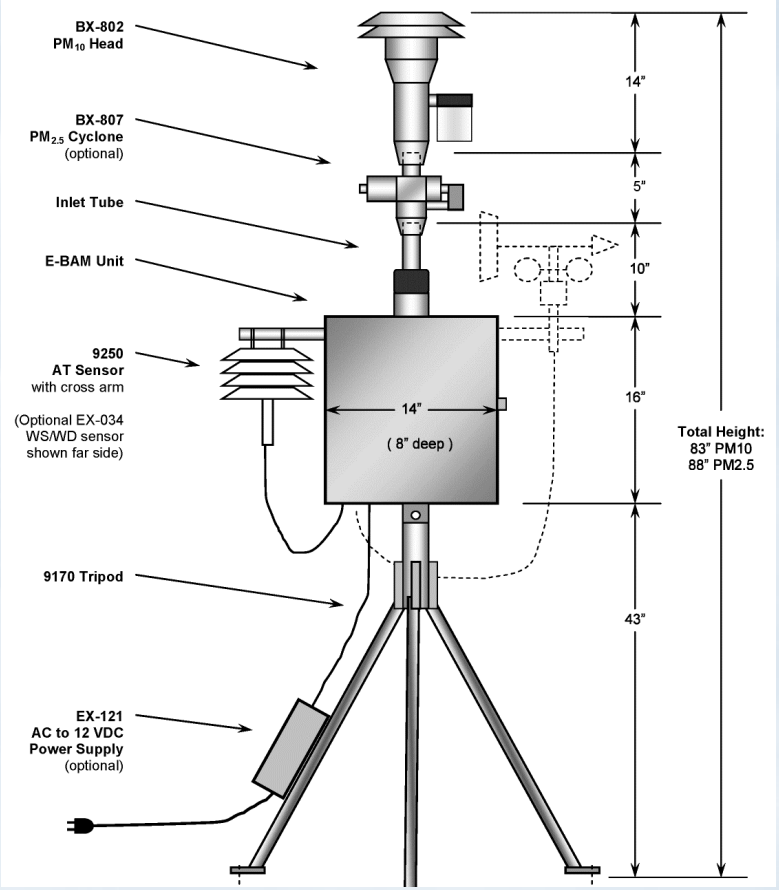
Met One E-BAM

Overview

- The Environmental Beta-Attenuation Monitor (E-BAM) is a portable device for measuring particulate matter (PM) from 0 – 1,000 µg/m^3, with a lower detectible limit of 1 µg/m^3.
- Can be configured to measure particulate matter less than 10 microns in diameter (PM_{10}) or less than 2.5 microns in diameter ($PM_{2.5}$)
- Readings are available as an hour average, or real-time, and are backed up internally in case communication is lost with our server
- Additional sensors can be utilized, such as wind speed, wind direction, and ambient temperature
- This is the primary device utilized for measuring smoke impacts from prescribed burns and wildfires, as well as short-term investigations and studies
- The E-BAM does not have an FEM designation, it is a survey tool



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Met One E-BAM

Deployment

- Things to consider
  - Reliable source of power
  - Proximity to sensitive receptors
  - Distance from nearest permanent monitoring station
  - Opportunity to interface with the public
- Typical deployment locations include public schools and libraries
- The District owns one E-BAM, with additional E-BAMs available for any neighboring district to borrow from the California Air Resources Board (CARB)

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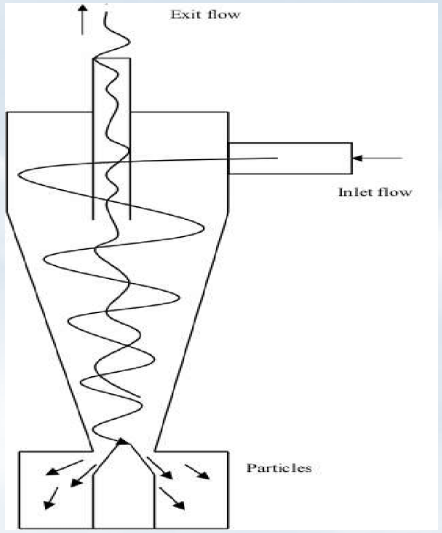
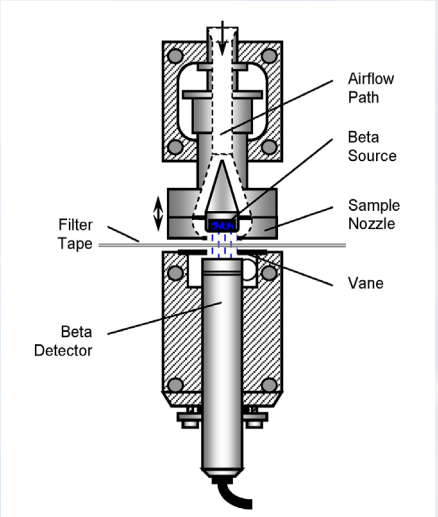
Met One E-BAM

Operation

- Ambient air is drawn via pump into the sample head, down through a filter tape, where PM is deposited. If the device is being used as a $PM_{2.5}$ monitor, the air will also travel through a cyclone cutter to filter any particles larger than 2.5 microns in diameter prior to deposition on the filter tape
- Using a beta radiation source and detector, the device can determine the total mass of particulates deposited on the filter tape
- The device then uses meteorological sensors to determine the total volume of air sampled, and displays readings as micrograms per cubic meter of air ($\mu g/m^3$)
- The readings are transmitted via cellular modem to the Data Acquisition System (DAS), and uploaded to the web for the public to view





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AirPointer

Overview

- The AirPointer is a portable, temperature controlled enclosure fitted with top of the line air monitoring instruments to measure PM_{10}, $PM_{2.5}$, and H_2S as well as meteorological parameters
- Unlike the E-BAM, the PM monitor does carry FEM designation for $PM_{2.5}$, but still not PM_{10}
- Custom fabricated rack and trailer allow for safe and easy deployment
- Internal data logger, but cellular modem allows real-time communication with DAS
- The District prepared a video highlighting the AirPointer's features and capabilities, which can be seen at ourair.org

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