



Board Agenda Item

TO: Air Pollution Control District Hearing Board

FROM: Aeron Arlin Genet, Air Pollution Control Officer 

CONTACT: Joel Cordes, Principal Monitoring Specialist (805-961-8816) and Sage Swain, Air Quality Specialist (805-614-6791)

SUBJECT: District Portable Instrumentation Overview

RECOMMENDATION:

Receive a presentation from District staff on the District's portable air monitoring and compliance instrumentation.

BACKGROUND:

The District has a network of stationary, long-term air quality monitoring stations located throughout Santa Barbara County that are used to assess compliance with federal and state ambient air quality standards. While the local network is extensive, it does not capture short-term events that occur in very localized conditions. Nor does the network provide the resources needed to determine if a local source facility is meeting district permit conditions. Consequently, the District uses a variety of portable equipment for regulated facility inspections, and to determine regulatory compliance during complaint investigations. In addition, portable equipment is used for informational purposes to assess local conditions during short-term events such as wildfires, prescribed burns, and for special studies.

DISCUSSION:

The District uses portable instrumentation to ascertain, track and assess compliance with federal, state, and Santa Barbara County's air quality standards, Rules and Regulations, and for informational purposes to protect the people and the environment from the effects of air pollution.

The table below provides a summary of the instruments used, emissions measured, and how District staff uses this information. Following the table, detailed information is provided for each instrument referenced. During the October 17 Board meeting, District staff will showcase the equipment and be available to answer any questions.

Aeron Arlin Genet, Air Pollution Control Officer

Instrument	Pollutants Measured	Reason
Toxic Vapor Analyzer	Hydrocarbons and other inorganic compounds	Compliance inspections and complaint investigations: Fugitive emissions from oil and gas, landfills, and contaminated soil facilities
Testo Combustion Analyzer	Combustion pollutants (NO _x , CO), N ₂ , O ₂	Compliance inspections: Exhaust from engines, boilers, steam generators, heaters
MicroPHASIR Asbestos Analyzer	Asbestos fibers (6 types)	Compliance inspections and complaint investigations: Asbestos at demolition and renovation sites
Jerome H ₂ S Analyzer	H ₂ S	Compliance inspections and complaint investigations: Odorous hydrogen sulfides for regulatory compliance and complaint response
MIE pDR-1500 Monitor	Aerosols/particulates	Compliance inspections and complaint investigations: Particles from dust complaints, contaminated soil, and construction sites
E-BAM Particulate Monitor (PM)	PM _{2.5} or PM ₁₀ Wind, Temperature	Short-term monitoring for smoke impacts from prescribed burns and wildfires, and PM studies
Airpointer Portable Monitoring System	H ₂ S PM _{2.5} and PM ₁₀ Wind, Temperature	Short-term monitoring for multiple applications including: regulatory compliance, complaint investigation, short term studies, and community air monitoring

Toxic Vapor Analyzer

The District uses Toxic Vapor Analyzers (TVAs) during inspections of facilities that emit hydrocarbons such as oil and gas facilities, landfills, and contaminated soil cleanup operations. During oil and gas facility inspections, the TVA is used to determine compliance with District Rule 331 Fugitive Emissions Inspection and Maintenance, Rule 325 Crude Oil Production and Separation, Rule 326 Storage of Reactive Organic Compound Liquids and CARB's GHG Emission Standards for Crude Oil and Natural Gas Facilities. During landfill inspections, the TVA is used to enforce CARB's Landfill Regulation. The TVA readings are compared to the applicable limit for fugitive compounds expressed in parts per million (ppm) defined by a permit, rule or regulation. When the limit is exceeded, corrective action by the facility is required and may lead to the issuance of a Notice of Violation (NOV).

The TVA measures total hydrocarbons and other compounds in the atmosphere. It does so by using either a Flame Ionization Detector (FID) or a Photoionization Detector (PID) or both, depending on the configuration of the instrument. The FID measures total hydrocarbons,

expressed in ppm and has a large dynamic range (0-50,000 ppm). The PID is very sensitive to aromatic and chlorinated compounds and can even measure some inorganic compounds that the FID does not detect such as ammonia, carbon disulfide, carbon tetrachloride, chloroform, ethylamine and hydrogen sulfide. However, the PID has a smaller dynamic range of 0-2,000 ppm.

Testo 350 XL Combustion and Emission Analyzer

The Testo 350 XL Combustion and Emission Analyzer (Testo) is used by the District to measure combustion pollutants during inspections of regulated facilities. District rules have limits for the amount of nitrogen oxides (NO_x) in the exhaust stream exiting a combustion device. In some cases the amount of carbon monoxide (CO) is also limited. If the emissions measured by the Testo exceed the rule limit, corrective action by the facility is required and may lead to the issuance of a violation. The applicable District Rules are Rule 333 Control of Emissions from Reciprocating Internal Combustion Engines, Rule 342 Boilers, Steam Generators and Process Heaters (5 MMBtu/hr and greater), Rule 360 Boilers, Water Heaters and Process Heaters (0.075-2 MMBtu/hr), and Rule 361 Boilers, Steam Generators, and Process Heaters (Between 2-5 MMBtu/hr), as well as specific conditions in District issued permits.

The Testo measures NO_x, CO, nitrogen monoxide (NO), nitrogen dioxide (NO₂) and oxygen (O₂) using chemical sensors located in the measurement box, and the results are given in parts per million. The dynamic range in parts per million of the pollutants measured are as follows: NO_x (0-4,500ppm), CO (0-10,000ppm), NO (0-4,000), NO₂ (0-500ppm) and O₂ (0-25%).

MicroPHAZIR AS Handheld Asbestos Analyzer

The microPHAZIR AS Handheld Asbestos Analyzer (microPHAZIR) is used to determine whether or not one or more of the six types of regulated asbestos fibers are in a given material. This aids in enforcing the Asbestos National Emission Standards for Hazardous Air Pollutants regulation at renovation and demolition sites. The microPHAZIR is an in-field, pre-screening tool used in conjunction with physical samples that may be sent to a lab for a more definitive analysis. The microPHAZIR shows the user a determination of which of the six fibers can be reliably reported in the material, if present.

The microPHAZIR is a self-contained screening tool that utilizes near-infrared spectroscopy to perform rapid in-field identification of the six types of regulated asbestos fibers - chrysotile, crocidolite, anthophyllite, tremolite, actinolite and amosite. If materials containing asbestos are detected with the microPHAZIR, a sample of the material is sent to the lab to determine the specific asbestos percentage.

Jerome J605 Hydrogen Sulfide Analyzer

The Jerome J605 Hydrogen Sulfide Analyzer (Jerome) is a portable ambient air analyzer used during inspections to determine compliance with District Rule 310 Odorous Organic Sulfides. Rule 310 prohibits the discharge of hydrogen sulfide (H₂S) or organic sulfides into the atmosphere which result in ground level concentrations at any point at or 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.

The Jerome uses a thin gold film that when in the presence of H₂S, undergoes an increase in electrical resistance proportional to the mass of H₂S in the sample. The sampling range is 3 parts per billion (ppb) to 10 ppm of H₂S. Readings of 100 ppb or less are displayed in units of ppb, and readings above 100 ppb (0.100 ppm) are displayed in ppm. Readings of zero are displayed as 0.00 ppb.

MIE pDR-1500

The MIE pDR-1500 (pDR-1500) is an active personal aerosol/particulate monitor that is used to determine compliance for contaminated soil clean-up permits which usually limit the amount of particulates at the property boundary of the site. It can also be used as a reference tool when responding to dust complaints and assessing compliance with District Rule 345 Control of Fugitive Dust from Construction and Demolition Activities.

The pDR-1500 uses a highly sensitive photometric light scattering configuration to measure the respirable fraction of airborne dust, smoke, fumes and mists in indoor and outdoor environments. It measures particles with sizes of 0.1 micrograms (μg) to 10 μg and has a range of 0.001 – 400 micrograms per cubic meter ($\mu\text{g}/\text{m}^3$). The instrument displays the real time concentrations of particulates in the ambient air as well as the time weighted average of the particulates throughout the duration of the sample. The units are in $\mu\text{g}/\text{m}^3$.

E-BAM

Environmental Beta Attenuation Monitors (E-BAMS) are effective, accurate, and easy to operate portable particulate monitors for measuring particulate matter (PM) emitted from short-term events. The District primarily uses E-BAMS to measure the smoke impacts from prescribed burns and wildfires, but they can also be used for short-term investigations and studies for other sources of PM (e.g., dust). The District currently owns one E-BAM, and additional E-BAMS are available to borrow from the California Air Resources Board (CARB). E-BAMS can be set up to measure either PM₁₀ or PM_{2.5} (particulate matter less than 10 microns in size, and less than 2.5 microns in size, respectively) in the range of 0 – 1000 $\mu\text{g}/\text{m}^3$, with a lower detectible limit of 1 $\mu\text{g}/\text{m}^3$. The E-BAM also has sensors to measure wind speed, wind direction, and temperature. A cell modem is utilized to transmit the data to the District's data acquisition system and, if warranted, onto our website.

Airpointer

The Airpointer is a specialized mobile monitor that provides safe and secure housing and transport for highly sensitive and accurate monitoring equipment. The Airpointer is mounted on a trailer for transport to a deployment destination and can be left on the trailer or rolled off for a more specific location. The District plans to use the Airpointer to measure PM and/or H₂S emissions associated with short-term events, investigations, and studies.

The Airpointer includes instrumentation to measure H₂S capable of detecting odorous gas down to 1 ppb or as high as 500 ppb. A particulate monitor is included in the Airpointer which will simultaneously measure both PM₁₀ and PM_{2.5} down to the 0.1 $\mu\text{g}/\text{m}^3$ or as high as 1000 $\mu\text{g}/\text{m}^3$. The PM_{2.5} measurements are designated by EPA as equivalent methods to the federal reference methods. The PM₁₀ and H₂S instruments provide highly accurate data which is comparable to the reference method samplers. The Airpointer also includes equipment to measure wind speed,

wind direction, and temperature. A cell modem is utilized to transmit the data to the District's data acquisition system and, if desired, to our website. Additional modules can be added to the Airpointer in the future to measure other pollutants as needed.

Low Cost Sensors

In addition to the portable instruments listed above, the District owns a few different types of low-cost sensors that can be used to measure air quality conditions. These low-cost sensors are battery-powered and can be used to quickly provide a basic understanding of air quality conditions. However, the data collected should not be used to inform important decisions until there is a clear understanding of how the data compares to readings from more reliable, reference-method equipment.

FISCAL IMPACT:

The costs associated with the purchase, operation, and maintenance of these portable instruments are included in the District's annual operating budget that is approved by your Board. No additional fiscal impact is anticipated.