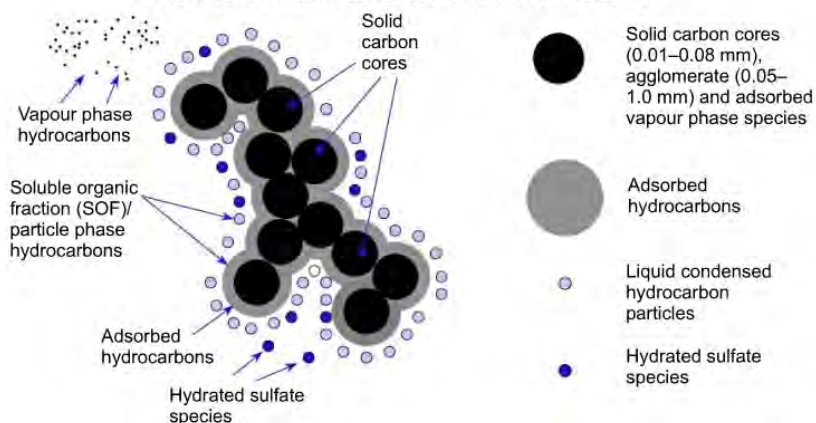




Diesel Particulate Matter

Driving along any interstate in California you would be hard pressed not to see any semi trucks traveling alongside of you. In fact, in California, trucking, or the transport of goods by semi truck, is the predominant mode of freight transportation. With this popular way of transporting our food, clothes and other products comes an issue that can affect everyone's health, diesel particulate matter. Diesel particulate matter (DPM) is not exclusive to semi trucks. Diesel particulate can be emitted from any engine burning diesel fuel, whether it is one running a generator or one that is powering a tractor on a farm. Diesel particulate can be harmful to our health and it is very important that we have ways to mitigate and control diesel particulate emissions.

Diesel Particulate Matter Formation



Diesel engines work when diesel fuel is injected and air is compressed in the cylinder of the engine and the fuel spontaneously ignites causing the piston to become in motion. There are times when all the fuel injected does not completely combust (usually due to not having enough oxygen) and when that happens you get diesel particulate matter emitting from the exhaust of the engine. When you see black or white smoke escaping from the exhaust pipe of a semi, you are seeing diesel particulates.

DPM is the soot and ash particles, sulfates and metallic abrasion particles. These fine/ultrafine particles can range in size from 0.02 nanometers to 0.2 nanometers, which are extremely small. The size of these particles makes them capable of being inhaled into our lungs.

DPM can cause many health problems among humans. Inhalation may cause throat, nose, eye and lung irritation as well as nausea and dizziness. It can also have many long-term effects such as cardiovascular disease, cardiopulmonary disease, asthma, chronic bronchitis and has been implicated in causing lung cancer. DPM contains polycyclic aromatic hydrocarbons and these molecules have the potential to mutate our DNA and cause uncontrollable cell growth. In 1998, DPM was listed as a Toxic Air Contaminant by the California Air Resources Board (CARB). It is estimated that 70% of airborne carcinogens in California are from diesel particulate matter.



CARB and local air districts have introduced rules and regulations to help decrease the amount of exposure to diesel particulate matter. Actions such as limiting idling and periodic smoke inspection programs were started by CARB to mitigate DPM from semi trucks. CARB requires all new semi trucks to be equipped with a diesel particulate filter (DPF) and older trucks to be retrofitted or repowered to meet the current emissions standard. Diesel particulate filters capture the soot and particulates associated with the combustion of diesel fuel. CARB has also created grant programs to help with the conversion of some stationary diesel engines (non-portable) to cleaner natural gas/propane powered engines, to retrofit them with DPFs or to help purchase new engines that meet the current standards. As research and technology progresses, we will hopefully see a progressive shift in the usage of cleaner burning fuels and in turn we will reap the benefits of cleaner air.

By Nicole Dickerson

Particulate Matter Controls

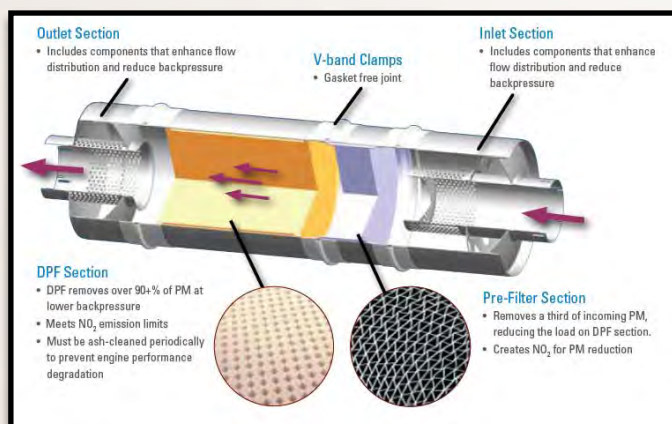
In last quarter's newsletter we talked about particulate matter. We had the cool picture of the human hair with relative size of PM₁₀ (particulate matter 10-microns in diameter and smaller) and PM_{2.5} (particulate matter 2.5-microns in diameter and smaller). Now, because we know the problem, let's talk about the solution (methods to control particulate matter emissions).

There are several methods of controlling particle matter. However, the two base methods are:

1. Controlling the emissions before it happens, and
2. Controlling the emissions after it happens.

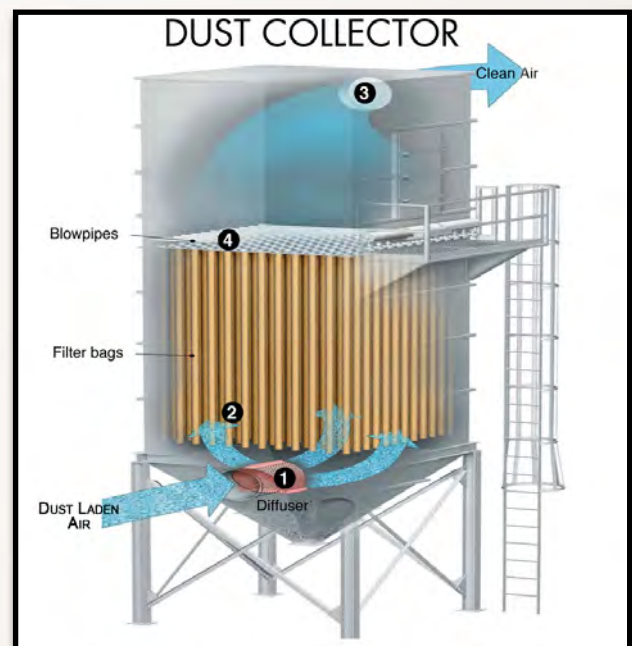
Often, when we think about particulate matter, we envision billowing dust flowing down a dusty road. So, let's start with one method to stop billowing dust. During the early part of 2017 there has been a lot of rain in Kern County. Most of us notice there is not billowing dust while it is raining; therefore, the first method to controlling dust (I'll mention) is the use of water. Water holds particles together, and stops them from becoming airborne. On construction sites, water is used (prior to construction) to minimize dust during the construction operations. This is one method of controlling the particulate matter emissions before it happens.

In this newsletter we talked about diesel particulate matter (DPM-from diesel fueled engines). One method to remove DPM is by the use of a Diesel Particulate Filter (DPF). The DPF captures over 90% of the particulate matter exhausted by the engine; thereby, reducing toxic air contaminant emissions generated by trucks and buses.



The final method of particulate matter control in this article is the use of fabric collectors; often called baghouses or dust collectors. Similar to your household vacuum cleaner, the fabric collectors use fabric bags or cartridges filled with filter material to collect dust and thereby control dust from industrial processes. The size and different fabric collector material may change, but the basic process is the following:

1. Dirty air from a process is drawn into the fabric collector from the outside of the bags (different from a vacuum cleaner).
2. The dirty air is cleaned by the filter bags.
3. Dirty material collected on the bags shaken (mechanical or pulse jet) to remove material from the outside of the bag.
4. Collected material is disposed. In the case of cartridge filters, cartridges are disposed and replaced.



The reduction of particulate matter into the atmosphere protects everyone. Scientists have observed reducing particulate matter reduces hospitalization rates, ER visits and doctor appointments for respiratory illnesses or heart disease. To "coin a phrase," better air quality helps us all breathe easier.

By: Glen Stephens

District News

DMV Grant Vehicle Voucher Program

The DMV Grant Voucher Program offers financial incentives to Eastern Kern residents for the purchase of eligible new lower-emitting vehicles.

The program is ongoing with no deadline to apply. Applications are processed first-come first-served and vouchers are issued accordingly. Grant vouchers are available for the purchase of the following new vehicle emission classifications:

\$2,000

For purchase of an Ultra-Low Emission Vehicle (ULEV).

\$3,000

For purchase of a Partial Zero Emission Vehicle (PZEV) includes Hybrid.

\$5,000

For purchase of a Zero Emission Vehicle (ZEV).

Applications and guidelines are available on the District's website: www.kernair.org.

Please contact the District with any questions: (661) 862-5250 or ekapcd@co.kern.ca.us

Debra Bias, Office Service Specialist, Retires

Debra Bias retired from the District on February 10, 2017. Debra was hired in December 2004, and served as Clerk of the District's Board of Directors until her retirements last month. Additionally, Debra was the secretary to the three Air Pollution Control Officers (Tom Paxson, David Jones, and Glen Stephens) during her tenure.

Debra's gregarious nature and friendly attitude made many feel warm and welcomed when coming to the District Office, or meeting her at one of the many Board Meeting she attended.

District staff was surprised when we learned of her sudden retirement. Debra is an avid equestrian, and enjoys talking about the horses she rides and owns. We wish Debra the best during this next phase of her life.

Happy Trails...

New Air Quality Engineer

The District welcomes our new employee, Air Quality Engineer Samuel Johnson. Sam is a Kern County native from Bakersfield. Sam obtained a Bachelor of Science Degree in Mechanical Engineering from Cal Poly Pomona.

Sam looks forward to tackling the many challenges associated with improving the District's air quality and maintaining a healthy environment for the residents of Eastern Kern County.



In our continuing efforts to keep you informed, please refer to the District's website: www.kernair.org for the most current information available regarding grant programs, rule development, news, Board agendas, public notices, reports, and forms.

Board of Directors

- Ed Grimes, Chair (Mayor, Tehachapi)
- Don Parris, Vice Chair (Councilman, California City)
- Peggy Breeden (Mayor, Ridgecrest)
- Mick Gleason (KC 1st District Supervisor)
- Zack Scrivner (KC 2nd District Supervisor)

Board of Directors usually meet once every two months starting in January at the Tehachapi Police Department Community Room.

Air Pollution Control Officer

Glen E. Stephens, P.E.

Hearing Board Members

- William Deaver
- Doris Lora
- Dr. Wallace Kleck
- Chris Ellis
- Charles Arbaut



For news updates and other information, please visit the Eastern Kern APCD website at www.kernair.org

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