



DESERT BREEZE

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Pollutants of the Quarter: Dioxins & Furans

Dioxins and Furans are POPs, or Persistent Organic Pollutants, also known as forever chemicals. Why are they classified as forever chemicals? These compounds are very stable and do not degrade quickly. This characteristic alone is a great concern for living organisms and our environment.

Dioxins are highly soluble in lipids (fats, oils, waxes, and vitamins A, D, E and K) and almost virtually insoluble in water. As a result of mixing well in lipids, they tend to accumulate in the fat of animals and humans, and the body takes an extreme amount of time to degrade these compounds.

Dioxins are characterized as a colorless solid or crystalline substance. The general chemical structure of a dioxin is a benzene ring with two oxygen atoms. They are usually by-products of the production of pesticides, herbicides, and paper as well as processes/operations such as municipal solid waste incineration, hospital and hazardous waste incineration, copper smelting, cement kilns, coal-fired power plants and the burning of household waste. Dioxins are also a by-product in cigarette smoke and wood burning.

Dioxins can be found in the air, soil, food, and water but air is a small percentage of exposure. The most common exposure (estimated to be around 90%) is through the consumption of contaminated food. Why is human exposure to dioxins important? Dioxins are toxic and have been proven to cause cancer in animals as well as a change in hormone levels, fetal development and can cause a suppressed immune system. Scientists believe that the effects of dioxins on animals is analogous to the effects on humans. In humans, it is also believed to cause chloracne which is a skin disorder that manifests as cysts, blackheads, and pustules.

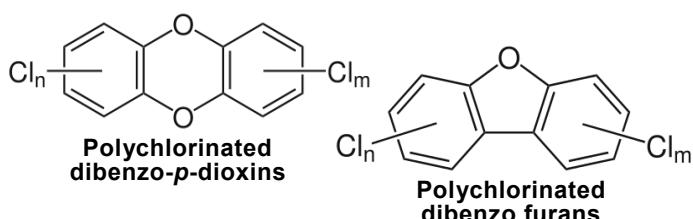
Of major concern to scientists and environmental agencies are PCDDs or polychlorinated dibenzo-p-dioxins. These are dioxins that contain a chlorine atom(s) and are said to bioaccumulate in living organisms, meaning they gradually buildup in the body, in this case, fatty tissue. Toxicity of a dioxin is related to the quantity and position of the chlorine atom

in the dioxin. They are rated by using the Toxic Equivalency Factor better known as the TEF which is used for regulatory purposes and risk assessment. The most toxic of all known dibenzodioxins, 2,3,7,8-Tetrachlorodibenzo-p-dioxin (TCDD), is the reference chemical when assigning a TEF to a dioxin. The time it takes for the human body to metabolize TCDD is said to be approximately 7-8 years. Agent Orange, the chemical defoliant used in the Vietnam War contained TCDD. Dioxins move into the body by attaching to the aryl hydrocarbon receptor also known as the AhR. The dioxin then moves into the nucleus of a cell where it can influence gene expression.



Furans, like dioxins, move into the body by attaching to the AhR. Furans consist of an aromatic 5-membered ring with carbon atoms and one oxygen atom. They are a colorless, flammable liquid at room temperature with a boiling point just above room temperature meaning they are volatile organic compounds (VOCs). Furans are found in commercial foods that have been heat-treated such as canned, jarred, and bottled soups, processed baby foods, coffee, etc. PCDFs or polychlorinated dibenzofurans are lipid soluble just like PCDDs and just like dioxins can cause cancer and developmental issues.

PCDDs and PCDFs are usually emitted into the air during combustion of organic materials and materials containing chlorine. It is important for industry as well as civilians take heed of the materials they are burning. These chemicals can penetrate and contaminate soil, water and foliage and affect living organisms and the environment for years.



By: Nicole Dickerson,
Senior Air Quality Specialist

PM₁₀ Attainment Status

PM₁₀ NAAQS

The 1970 Federal Clean Air Act (FCAA) required the U.S. EPA to develop health-based National Ambient Air Quality Standards (NAAQS) for several categories of air pollutants, including finely-divided particulates. A standard for total suspended particulates (TSP) of less than 40 microns was adopted. In 1985, the U.S. EPA revised the NAAQS to replace the TSP standard with a PM₁₀ limit of 150 micrograms per cubic meter ($\mu\text{g}/\text{m}^3$) averaged over a 24-hour period. PM₁₀ are fine particles with an aerodynamic diameter of ten microns or less. PM₁₀ is a regulated air pollutant because it can be inhaled deep into the respiratory system and lead to a variety of health effects. See *Desert Breeze Volume 4 Issue 4 (December 2016)* for a complete PM₁₀ article.

PM₁₀ Planning Areas

U.S. EPA considers PM₁₀ a "localized" pollutant as opposed to a "regional" pollutant such as ozone. Consequently, attainment/nonattainment designations can apply to limited areas instead of a whole district or air basin. In 1987, the U.S. EPA identified the Searles Valley as a region with the high probability of PM₁₀ exceedances and listed it in the Federal Register as a Group I Area with a 95% probability of exceeding the NAAQS's.

The Searles Valley Planning Area was classified as "Moderate" nonattainment in 1990. At that time, the Planning Area included sections of the following three air districts: Eastern Kern APCD (Indian Wells Valley), Great Basin Unified APCD (Coso Junction), and Mojave Desert AQMD (Trona). In 2001, the U.S. EPA divided the Planning Area into separate subareas, delineated by the three air districts. Eastern Kern's portion of the

Searles Valley Planning Area is comprised of approximately 566 square miles of the southern half of the Indian Wells Valley (IWF), located within Kern County.

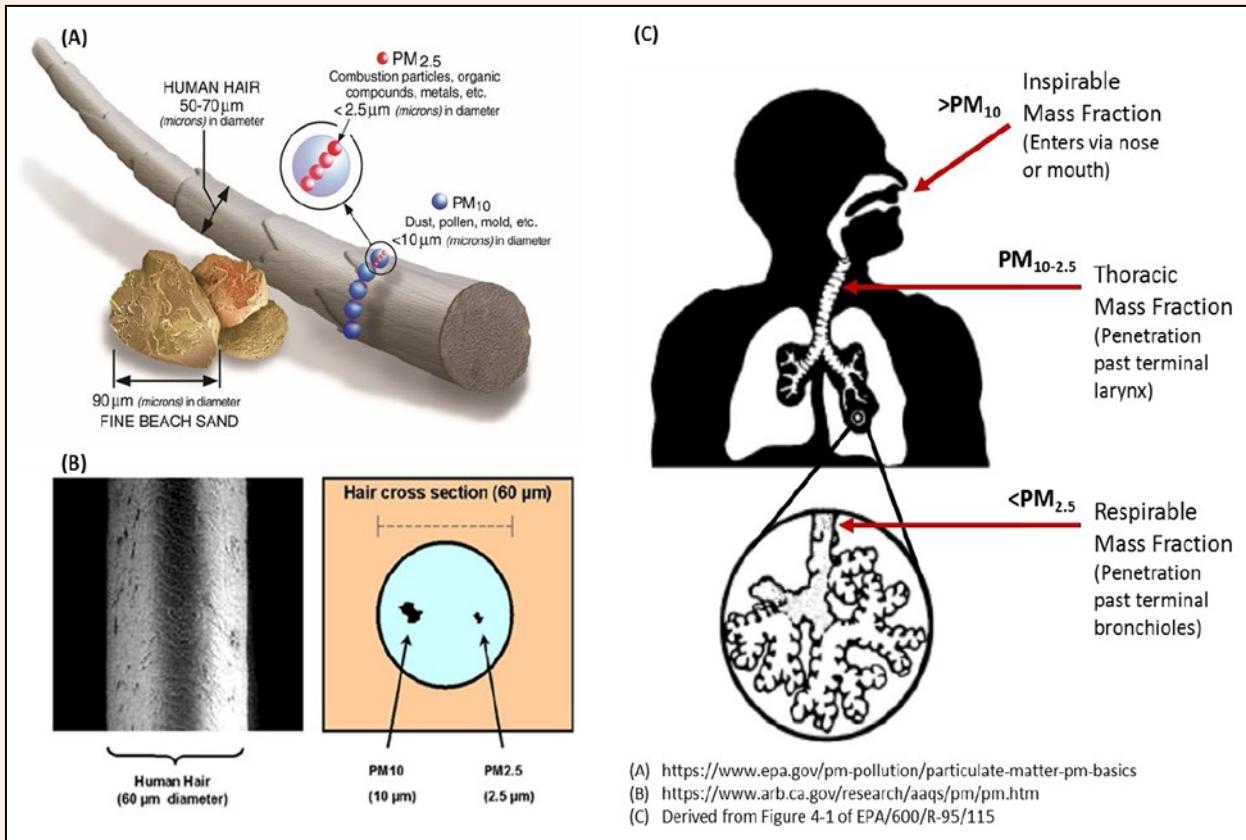
IWF Attainment-Maintenance Plan

In 2003, the U.S. EPA approved the District's IWF PM₁₀ attainment demonstration, maintenance plan, and re-designation request. The IWF was reclassified to Attainment. The plan projected that PM₁₀ emissions would decline and then remain constant through 2013. This proved to be true; there were no exceedances and PM₁₀ emissions remained relatively flat. The FCAA required the District to submit a second PM₁₀ maintenance plan, which demonstrated continued attainment for at least ten additional years. The District's Board adopted the second maintenance plan on May 7, 2020. Forecast air modeling shows continued attainment well beyond the end of the maintenance period.

Nonattainment Area

A majority of the District, aside from the IWF, is designated Unclassifiable/Attainment pursuant to the PM₁₀ NAAQS. However, the Kern River Valley, Bear Valley, and Cummings Valley were included in the San Joaquin Valley Air Pollution Control District's PM₁₀ Serious Nonattainment Area prior to becoming part of Eastern Kern's jurisdiction. In 2008, this region was designated as a nonattainment planning area of the District. Although air monitoring has shown it to be in attainment, it has not been officially reclassified as attainment. The District is continuing to work with CARB and U.S. EPA to get the area reclassified.

By: Jeremiah Cravens, Senior Air Quality Specialist



Indoor Fire Safety

As the weather starts getting into the colder season of winter, the natural place to be is indoors, next to a fire. Well, to be safe while heating indoors, here are some tips and suggestions to help have a safely warm home during the holiday season:

- ◊ Ensure that there is a carbon monoxide and smoke detector installed in your house; the best places are near the fireplaces and in the bedrooms. Also, make sure to check the detectors and ensure a functional battery is installed and that the detector is working.
- ◊ Have a fully charged fire extinguisher available.
- ◊ Make sure everyone in the house knows where and how to exit the house in the event of a fire. An Emergency Exit Plan.
- ◊ Never leave a fire unattended. Ensure that the fire is completely extinguished before going to bed or leaving the house.
- ◊ Only burn firewood in the fireplace. Do not burn trash, scrap wood or plastics, as the smoke can be toxic.
- ◊ Check to be certain that the flue damper is open before starting a fire. If the flue is closed when a fire is started in the fireplace, smoke will fill the room rather than exiting out the chimney.
- ◊ Do not burn charcoal to warm indoors. The burning of charcoal inside will release carbon monoxide and lower the level of oxygen in the home.
- ◊ Check the chimney and clean the built-up soot that could have accumulated.
- ◊ Look to install a stainless-steel liner to keep fire embers contained in the fireplace.
- ◊ Do not burn candles for warmth, and do not leave them unattended.
- ◊ If you have a wood burning stove or fireplace, use dry wood only.
- ◊ If you have an older Wood Stove, consider changing to an EPA Certified Wood Stove. The Eastern Kern Air Pollution Control District receives grant funds to encourage residents to replace their wood stoves with more efficient ones.
- ◊ Ensure that ashes from a fireplace or wood stove have completely cooled before disposing of the material.
- ◊ Consider switching to a pellet stove or using an alternative cleaner fuel such as natural gas or propane.



By: David Arokiasamy, Air Quality Specialist

Hearing Board Vacancy

When a stationary source is currently, or likely will be, out of compliance with the District's rules and regulations or permit guidelines, the source must petition for a variance. A Variance Hearing Board assesses the variance applications and grants or denies the variance based on a set of criteria defined by Health and Safety Code 42352. Further, the board assesses appeals of permit denials, appeals of permit issuance, orders of abatement, and revocations of permits.

There is currently one vacancy on the Variance Hearing Board and the District is soliciting candidates willing to serve in this position. The full Hearing Board usually meets one to two times per year, generally in the Tehachapi Field Office, however meetings may be held in one of the other eastern Kern County towns, as needed.

The Hearing Board members must reside in the District's jurisdiction, are appointed up to a

three-year term, and must fulfill ethics training and Statement of Economic Interest requirements. Compensation for service on the Hearing Board includes standard federal mileage reimbursement and a \$100 stipend per meeting. The District's Board of Directors may consider the appointment of a candidate to the vacant position at the nearest regular meeting.

Any person interested in being considered to fill this vacancy should file a written statement requesting to serve on the Hearing Board; please include the candidate's name, address, telephone number, brief statement of work experience, education, and other qualifications. Submit the statement as soon as possible to Katie Lantz, Clerk of the Board of Directors, EKAPCD, 2700 M St., Ste. 302, Bakersfield, CA 93301.

By: Katie Lantz, Air Quality Support Specialist

Board of Directors

Michael Davies, Chairman (Councilman, Tehachapi)
Zack Scrivner, Vice-Chair (KC 2nd District Supervisor)
Phillip Peters (KC 1st District Supervisor)
Kyle Blades (Councilman, Ridgecrest)
Jim Creighton (Councilman, California City)

Board of Directors usually meet once every two months starting in January. The location, along with the Meeting Agenda, can be located on the District website www.kernair.org, under the "Board" tab.

Air Pollution Control Officer

Glen E. Stephens, P.E.

Hearing Board Members

Doris Lora
Chris Ellis
Benjamin Dewell
Brett Moseley
One Vacancy



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

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