



DESERT BREEZE

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Pollutant of the Quarter: Respirable Crystalline Silica

Silica (SiO_2) is a naturally occurring metal oxide, common forms of which include agate, amethyst, flint, sand, and quartz. Silica is utilized in several capacities critical to society, such as in road and building construction, manufacture of glass and ceramics, hydraulic fracturing for oil and gas recovery, and for filtering municipal water in water treatment plants. Extremely fine grades of silica, also referred to as silica flours, are used in toothpaste, metal polishes, paints, and wood fillers. Respirable crystalline silica (RCS), defined as silica particles of 4 microns or less in diameter, is a known carcinogen that can also have significant non-carcinogenic health impacts on individuals chronically exposed to it.

Exposure to RCS mainly occurs in industrial and occupational environments. Mining and quarrying operations, cutting, crushing, and grinding processes, and sandblasting operations are frequently found to have elevated levels of RCS in the air at the worksite. Consumer products, such as sandpaper and grout, also contain RCS and their use may result in RCS exposure. In desert regions, where silica content in the soil is typically higher than other areas, wind-borne dust may also contain RCS particles.

RCS particles are small enough to slip past the natural defenses of the lungs and embed themselves deep in the lungs, causing scar tissue to form and reduce lung function. Chronic RCS exposure can result in development of serious diseases, including silicosis, chronic obstructive pulmonary disease (COPD), kidney disease, and lung cancer. These diseases can be disabling and fatal to humans, and in the case of silicosis and COPD, are typically not reversible or curable.

The Eastern Kern Air Pollution Control District (District) has implemented multiple measures to reduce public exposure to RCS. The District has several rules that limit the amount of particulate matter (PM) that is allowed to be emitted from

stationary sources of air pollution. When new stationary sources of pollution are proposed, the District requires the facility to implement "best available control technology (BACT)" to control air pollutant emissions, and also assesses the potential health risks to nearby businesses and residents as part of its permit evaluation process, utilizing methods developed by the California Office of Environmental Health Hazard Assessment (OEHHA) and the California Air Pollution Control Officers Association (CAPCOA). As part of the AB2588 Air Toxics "Hot Spots" Program, the District also regularly assesses existing facilities for the health risk presented by toxic air contaminant emissions (including RCS) from the facilities. District Rule 402 (Fugitive Dust) requires operations involving outdoor bulk material storage piles, construction, earthmoving, and land clearing activities, but which may not necessarily require a permit from the District, to implement control measures to reduce fugitive dust emissions from parts of the operation that can create fugitive dust. Larger operations of this type are required to submit a Fugitive Dust Emission Control Plan to the District for approval prior to beginning operations.

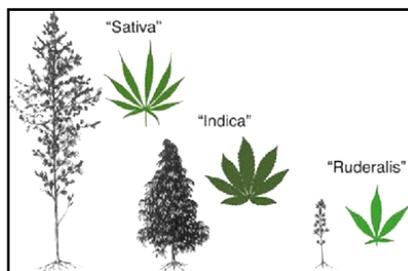
By: Sam Johnson



CANNABIS: Cultivation Part 2 of 4

In the last Desert Breeze article we talked about the District's involvement in permitting cannabis activities including cannabis cultivation and manufacturing. In this edition of Desert Breeze, we will focus on the cannabis cultivation process itself, the air contaminants emitted by this process, and best available controls for mitigating the release of these air contaminants.

As we know from the last article, the cannabis drug or marijuana comes from a group of three plants with psychoactive properties, known as cannabis sativa, cannabis indica, and cannabis ruderalis. The sativa plant has long, narrow leaves and is capable of growing up to 18 feet in height. The indica plant is much shorter at about 3-6 feet and has short, broad leaves. The ruderalis is the shortest of the three at only about 1-foot in height and has thick stems and wide leaves. What makes the ruderalis plant stand out, is that it reaches maturity very fast, it can be grown in extreme environments and has auto flowering traits. Modern cannabis usually comes from



a hybrid of these plants. These hybrids are what we commonly know as "strains". A cannabis strain is a cannabis plant that is reproduced to contain very distinct cannabis characteristics such as taste, color, aroma,

and cannabinoid content ratios. Some common strain names include OG Kush, blue dream and GSC ("girl scout cookies").

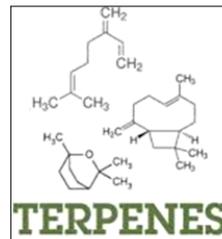
Cannabinoids are one of three classes of compounds found in cannabis plants along with terpenoids, and flavonoids. Terpenoids are responsible for the aroma in cannabis and are also found in most flowering plants. Cannabinoids on the other hand are compounds unique to cannabis, which include delta-9 tetrahydrocannabinol (THC) and cannabidiol (CBD). As we know from the last article, THC is the main psychoactive compound responsible for the "high" associated with the drug while, CBD is the non-psychoactive part that can be used to help reduce inflammation and ease pain. In the wild, feral cannabis contains roughly similar amounts of THC and CBD. However, modern strains and cultivation practices, yield cannabis plants with substantially higher ratios of THC to CBD. The ratio of THC to CBD depends greatly on the plants genetic makeup or "strain" but also can depend on specific growing conditions, including temperature, humidity, lighting, and space. THC and CBD compounds are mainly concentrated on the buds or flowers of the plant with only a small percentage remaining on the leaves. Several varieties of Cannabis plants are known as hemp which have very low THC content and are instead grown for their fiber and seeds. Industrial hemp comes from the cannabis sativa variety and was one of the first plants to be spun into usable fiber



more than 50,000 years ago. More recently, hemp has been used to make consumable products like paper, milk, makeup, jeans, biodegradable plastics, diapers, bags and animal food.

As mentioned before, during cultivation cannabis plants release natural aromatic hydrocarbons called terpenes. Terpenes give cannabis its very distinctive aromas and flavors like citrus, mint, and pine.

However, terpenes are also classified as Volatile Organic Compounds (VOCs), which contribute to air pollution via ozone formation, see the Desert Breeze September 2017 issue for more information. Additionally, the strong odors associated with cannabis cultivation can negatively affect the surrounding community and cause a public nuisance. Thus, District Rules require cannabis cultivation facilities to be constructed or equipped with best available control devices. Common devices used to control VOC emissions in cultivation operations include carbon filters and mist absorption systems. Carbon filters work via adsorption which means VOCs physically adhere to the activated charcoal surface. Absorption methods using misting or fogging devices works by spraying a liquid odor counteractant to trap and dissolve VOC emissions. Therefore, it is important for cannabis cultivation facilities to obtain an Authority to Construct (ATC); this provides an air pollution pre-construction review and ensures the facility is equipped with adequate air pollution control devices. In the next edition of Desert Breeze, we will discuss cannabis manufacturing or extraction of cannabis oils and how the District is involved in reducing emissions from such facilities.



By: Miguel Sandoval

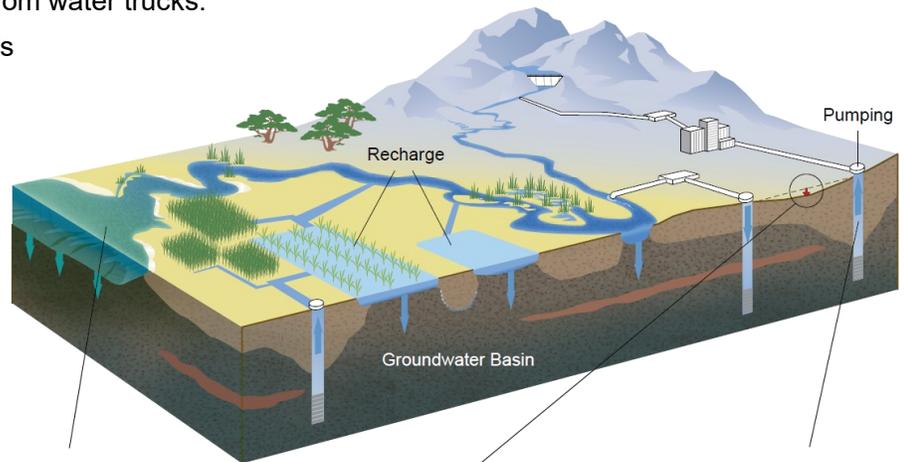
SUSTAINABLE GROUNDWATER MANAGEMENT ACT

Groundwater is a critical component of California’s water supply. Groundwater normally accounts for about 40 percent of the water supply in California, and up to 60 percent during drought. Some regions have pumped more groundwater than can be replenished, thereby causing historically low levels in those areas. In an effort to bring water basins back into balance after years of over pumping, the State enacted the Sustainable Groundwater Management Act (SGMA). SGMA required local Groundwater Sustainability Agencies (GSAs) to develop Groundwater Sustainability Plans (GSPs) by January 31, 2020. GSPs are designed to balance local basins that have been identified as critically over-drafted.

Eastern Kern County is generally a dry arid region of California, there is little rainfall and most of the water is pumped from wells. In short, much of Eastern Kern is a desert and water use is a concern. So why is the District concerned with SGMA? Eastern Kern has seen a substantial amount of development and construction throughout the District, specifically with solar power generating facilities. There are periods of high winds and when the natural vegetation is disturbed by excavating and grading, the dust blows. The primary dust mitigation strategy has been water application from water trucks.

Historically, water trucks filled from local wells would be used at large operations to crust the topsoil if a dust-event occurs. However, enactment of GSPs through SGMA in water scarce regions such as Eastern Kern is limiting the use of water application for dust suppression. Alternative dust mitigation strategies must be employed. Some of the dust control alternatives include, if feasible, limited or phased grading and mowing indigenous plants to leave the root systems in place to stabilize soil and easily regrow in the future. If grading is necessary, a non-toxic dust palliative such as Gorilla Snot can be sprayed on the topsoil to produce a crust or a hydro-mulch can be applied to cover it. As our environment continues to change, technology is advanced to meet our needs.

By: Jeremiah Cravens



SEAWATER INTRUSION

When a groundwater basin near the coast depletes, saltwater from the ocean begins to move further inland, contaminating the fresh water with saline. This condition is known as seawater intrusion.

SUBSIDENCE

Overpumping of groundwater can cause a basin to collapse, known as subsidence, and lead to permanent loss of storage capacity. Land sinking due to subsidence can impact infrastructure on the surface such as bridges, roads, levees, and canals.

DEGRADED WATER QUALITY

Overpumping of groundwater may contribute to the impairment of drinking water quality.

Notes from the APCO



Most of us look forward to summertime weather. The long days, the warm weather, time in the pool, vacations away from home, and cool ice cream seem to make the summertime one of the happiest time of the year. However, with the summertime comes ozone season.

What is ozone season? Ozone season is a period of time in which ground level ozone typically reaches its highest concentrations in the air we breathe. In District’s jurisdiction, this is usually between May and October. The reasons for higher ozone during the summertime are twofold: more travel and more sunlight (higher temperatures).

Why does ozone increase because of travel? Oxides of nitrogen and volatile organic compounds. Most planes, trains, and automobiles are powered by fossil fuels, which are combusted to cause locomotion. All fossil fuels are hydrocarbons (long

chains of molecules with carbon and hydrogen atoms). When hydrocarbons are combusted in air, four molecules are always produced: carbon dioxide, water, oxides of nitrogen and volatile organic compounds. At ground level, oxides of nitrogen and volatile organic compounds are combined in the presence of sunlight and heat to create ozone (O₃). For more information on ozone see Desert Breeze, June 2013 at www.kernair.org.

However this year, with the COVID-19 Global Pandemic, we are “stepping into uncharted waters.” Because of COVID-19, many of our travel plans have been postponed or cancelled. Therefore, we are not sure how the society will respond to the early postponements. Will the travel happen later in the summer months, fall, or winter? We shall see how society responds to the global COVID-19 pandemic. My advice: Let’s all travel responsibly and efficiently, and let’s minimize our ozone this season.

- Glen

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

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