DESERT BREEZE

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ROCKETS

WHY DO WE CARE?

On June 8, 2007, I was at the Kennedy Space Center and was fortunate to watch the Space Shuttle Atlantis lift into space. As you know, the space shuttle has two solid rocket boosters on each side of the external tank (containing liquid oxygen {LOX} and liquid hydrogen) that supplies the shuttle main engine during lift-off. As most of you know, combustion of oxygen and hydrogen produces no "pollution", just water vapor. Strangely enough, the Space Shuttle main engine produces only 28.6% of the thrust to lift the space shuttle off the pad. The other 71.4% of the thrust is provided by the solid rocket boosters.

The propellant mixture in each solid rocket booster consists of ammonium perchlorate (oxidizer), aluminum (fuel), iron oxide (catalyst), and polymer (binder that holds the mixture together) and an epoxy during agent. When the propellant is ignited, the emissions contain simple products like aluminum oxide (a simple abrasive) and ammonia (a hazardous air pollutant that is harmful to the lungs when breathed). The good thing is, most of the booster emissions occur in the upper atmosphere and not at ground level (air districts are primary concerned with ground level emissions – less than 3000-feet). However, before the booster rockets are used for lift-off, each rocket is designed and tested to assure it consistent operation. These rocket tests are done at ground level.

Rocket Testing at the Mojave Air & Space Port

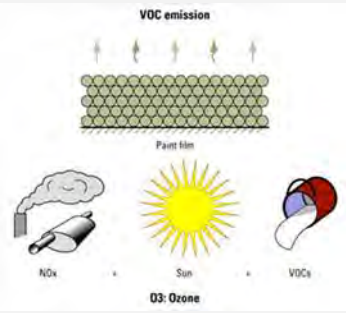
Aside from solid fuel propellants, there are a myriad of liquid rocket fuels. Some of the more popular liquid rocket fuels are: LOX and kerosene (RP-1); nitrogen tetroxide and hydrazine; and monomethylhydrazine (MMH) and nitric acid. There are a few gaseous rocket propellants: however, because of the low density of the fuel and high weight of the pressure vessels used to store the fuel and oxidizer, gaseous fuels are rarely used.

Hydrazine and MMH are controlled substances, therefore, have a tendency to be utilized mostly for military operations or NASA (National Aeronautics and Space Administration) operations. Rockets that utilize LOX and RP-1; LOX and isopropyl alcohol; LOX and propane; or LOX and methane mostly carbon dioxide and water as emissions; therefore, from the Eastern Kern Air Pollution Control District (District) point of view, the emissions are not significant.

In 2007, the District adopted Rule 431 (Propellant Combustion and Rocket Testing); this Rule is designed to require all significant rocket testing and propellant combustion operations have a plan to be utilized when proceeding with their operations. Rocket testing operations, generally, have no emission controls; therefore, it behooves each operation to have a plan; the District to be aware of the plan; and approve the plan to assure rocket emissions do not negatively affect the community at large.

Paint

Paints are coatings used to protect and color the surface of an item. It can be applied with brushes, rollers or spray guns. All protective coatings (paints) are formulated as a mixture of four main components – binder (a resin or drying oil), volatile solvents (organic or water), colorizing pigments and additives. Critical components that affect our health and environment are pigments, solvents (especially organic solvents) and some additives.



Pigments are solid substances dispersed throughout the coating to give the paint a color and opacity. Some common pigments in the paint are titanium dioxide, zinc chromates and carbon black. Those pigments along with other pigments are toxic and carcinogenic to humans which can cause cancer. Therefore, in order to properly protect from inhalation of toxic pigments while painting, using respiratory protective equipment (mask) is recommended. Additionally, the Air District requires paint spray booths to be equipped with filters to minimize particulate matter emissions into the atmosphere.

Different types of solvents are used for different applications. The function of organic solvents in a paint relates to certain properties it brings – it facilitates the paint's application in thinning or dilution and it accelerates curing of the paint. During application and curing, solvents evaporate. When they evaporate, those organic solvents can release Volatile Organic Compounds (VOCs) into the atmosphere which are a potential human health hazard and also harmful to the environment. Because VOCs are ozone precursors. VOCs react with Nitrogen Oxides (NOx) to form ground level or "bad" ozone in the presence of sunlight.

Fifty years ago, virtually all paints were organic solvent-based paints. However, regulations imposed by U.S Environmental Protection Agency (EPA) and California Air Resources Board (ARB) and today's advanced technology in paint bring modern, water-based paint, also known as latex paint. As its name indicates, the main solvent used in water-based paints is water. Because of significantly less VOCs content in water-based paints and public awareness of VOCs effects, water-based paints are increasingly replacing organic solvent-based paints across a broad range of paint applications. Today, water-based paints dominate and account for roughly 80% of paints sold in the residential market. Additionally, water-based paints are also expanding into the future of automotive coatings.

Quick Tip: A simple way to determine if a paint is water-based or solvent-based is to check on the label about how to clean brushes. Brushes used for Solvent-based paints require mineral spirits or turpentine; however, brushes used for water-based paints can be cleaned with warm, soapy water.

All automotive paint manufacturers are working on this technology and many have already released water-based products into both the OEM and refinishing markets. Therefore, the District recommends choosing water-based paints over solvent-based paints and wearing masks while painting not only helps protect our health but also achieve our goal towards cleaner air.

Arsenic

The 'discovery' of the element Arsenic is attributed to Albertus Magnus around the year 1250. Use of, and knowledge of Arsenic and Arsenic compounds pre-dates Albertus Magnus' documentation. For example, the Egyptians used it when gilding metals. Arsenic has many uses: In Victorian times it was prepared in dilute solution as a healing tonic, mixed with vinegar and chalk women would eat it to 'improve' one's complexion (a paler face was seen as a sign that one did not work in the fields), and, it also could be rubbed on the skin of the arms and the face for the same purpose. Although losing favor, Arsenic is also used as a feed additive in poultry and swine production, to increase weight gain and prevent disease.

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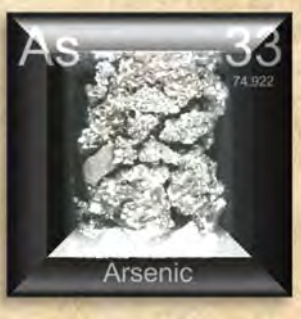
ARSENIC *(Continued from page 2)*



Industrial uses of Arsenic include wood treatment, strengthening alloys, semiconductor manufacture, and the '-cides': Including pesticide, herbicide, and insecticide. Arsenic has long been known as a poison, and has enjoyed a notorious reputation as such. Odorless, colorless, and tasteless; it is easily administered to foods and beverages to produce severe abdominal cramps, cardio-vascular and nervous system disruption, and even death. Before the advent of tests to identify the presence of Arsenic in the deceased, it was the active ingredient in many murders, including some very famous ones. Kings, Cardinals, heirs, and spouses have all been unknowingly brought to an untimely end with it.

Arsenic (elemental symbol As, and atomic number 33) is a naturally occurring element; approximately 0.00015% (15 parts per million) of the crust of the Earth is Arsenic, making it the 53rd most abundant element.

Natural exposure to Arsenic is common, and typically not significant enough to produce symptoms of Arsenic poisoning. Volcanic ash, weathering of ores, groundwater, and foods all may contain Arsenic to some degree. Leafy vegetables, rice, apple and grape juice, and seafood (especially Shrimp) are foods that contain Arsenic.

One of the primary routes of exposure for those who do not get exposed to Arsenic in an occupational setting is groundwater. Arsenic in the soil is usually bound to another salt, and will dissolve readily in water. Natural variation in the composition of the Earth's crust, and the presence of groundwater can result in locales with elevated concentrations of Arsenic, and concentrations of chronic and acute Arsenic poisoning.

Arsenic in the atmosphere comes from high-temperature processes such as coal-fired power plants, burning vegetation and volcanic activity, and the burning of other Arsenic containing products, such as treated wood. The District encourages proper disposal of all wastes, in particular, those that can be burned.

On-going Rule Development

People can go days without food, hours without water, but will last only a few minutes without air. On average, each of us breathes over 3,000 gallons of air each day. We must have clean air to survive and remain healthy. Air pollution causes many health issues, in addition to damaging trees, crops, other plants, lakes, animals, the environment, buildings, monuments, and statues.

In order to reduce air pollution and protect public health and welfare across the nation, Congress passed the Clean Air Act (CAA) in 1970. The CAA required EPA to establish national ambient air quality standards (NAAQS) for certain common and widespread pollutants based on the latest science. EPA set air quality standards for the following six common "criteria pollutants": particulate matter, ozone, sulfur dioxide, nitrogen dioxide, carbon monoxide, and lead. This required states to adopt enforceable control measures designed to achieve and maintain the NAAQS.

Since then 35 "local" air districts were created in California. An air district is a group of counties, portions of counties, or an individual county specified in law with authority to regulate stationary, indirect and area sources of air pollution within the region and governed by a regional air pollution control board comprised mostly of elected officials from within the region. The Eastern Kern Air Pollution Control District (District) has approximately 134 adopted and enforceable rules/regulations.

The District's rules are constantly reviewed and periodically revised as industry, science, and technology change. Occasionally new rules will be drafted and adopted as required. The District will be holding a public hearing March 12, 2015 in Rosamond, CA, beginning at 2 pm to consider adopting amendments to Rules 301 (Permit Fees), 302 (Permit Fee Schedules), 303 (Miscellaneous Fees), and 402 (Fugitive Dust) along with adoption of Draft Rule 402.2 (Agricultural Operations).

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Board of Directors usually meet once every two months starting in January at various locations.

Air Pollution Control Officer

Glen E. Stephens, P.E.

Hearing Board Members

Bill Deaver

Herb Roraback

Doris Lora

Dr. Wallace Kleck

James Bell

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

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