Mobile Sources *and Rhode Island*

Fact Sheet #2—Air Pollutants/Vehicle Emissions

August 2014

Air Pollutants/Vehicle Emissions

When a mobile sources' engine is running, several different types of gases and particles are emitted. Not only do emissions come from the by-product of the combustion process (the exhaust) but also from evaporation of the fuel itself (evaporative emissions).

Carbon Monoxide (CO)

CO is a poisonous, colorless, odorless, and tasteless gas.

Mobile Sources of CO: CO is commonly emitted from vehicles due to the incomplete burning of natural gas and any other materials containing carbons such as gasoline, oil, or propane.

CO & Your Health: Is harmful when breathed because it takes the place of oxygen in our blood stream. Our bodies receive less oxygen if we breathe carbon monoxide. The health threat is most serious for children, the elderly, pregnant women, and those who suffer from heart disease, but at higher levels of exposure, healthy individuals are also affected.

CO & the Environment: CO is a weak greenhouse gas (GHG) and its presence affects concentrations of other GHG including methane, tropospheric ozone and carbon dioxide.

Carbon Dioxide (CO_2)

CO_2 is a greenhouse gas. Greenhouse gases contribute to global climate change.

Mobile Sources of CO_2: CO_2 is commonly emitted from vehicles due to the burning of fossil fuels

CO_2 & Your Health: Direct exposure to CO_2 could result in headaches, dizziness, difficulty breathing, tiredness, increased heart rate, elevated blood pressure, coma, asphyxia, and convulsions. Higher levels of CO_2 in our atmosphere are increasing the rate of global warming and the negative health effects that come along with it.

CO_2 & the Environment: CO_2 is constantly being exchanged among the atmosphere, ocean, and land surface as it is both produced and absorbed in nature (plants and animal). Human activities are altering the carbon cycle – both by adding more CO_2 to the atmosphere and by influencing the ability of natural sinks to capture and store CO_2.

Hydrocarbons (HC)

HCs are organic compounds and are volatile enough to exist as vapor in the atmosphere under normal conditions.

Mobile Sources of HC: HC is commonly emitted from vehicles due to the incomplete burning of fuels such as, natural gas, gasoline, diesel, or propane. HCs are also emitted by evaporation of fuels. Fuel evaporation increases as the temperature outside increases; when the engine remains hot for a period of time after the car is turned off; and when the fuel tank is being filled.

HC & Your Health: A number of HCs and VOCs are proven or suspected to cause cancer.

HC & the Environment: HCs contribute to the formation of secondary pollutants such as ground level ozone (O_3), to the depletion of stratospheric ozone, and indirectly to the formation of atmospheric acidity.

Nitrogen Oxides (NO_X)

NO_X are a group of gases comprised of nitrogen monoxide (NO) and nitrogen dioxide (NO_2). NO makes up the majority of NO_x emissions. NO_x contributes to the formation of ozone and particulate matter.

Mobile Sources of NO_X: NO_x is emitted during fuel combustion.

NO_X & Your Health: NO_x exposure could result in respiratory irritation, headaches, pulmonary emphysema, impairment of lung defenses, eye irritation, and loss of appetite. The health threat is most serious for children, asthmatics, as well as individuals with chronic bronchitis, emphysema or other chronic respiratory diseases.

NO_X& the Environment: NO_x is involved in the formation of ground-level ozone in the lower atmosphere. NO_x also contributes to the formation of acid rain, eutrophication of soil and water, and haze.

Sulfur Dioxide (SO_2)

SO_2 is a colorless gas or liquid with a strong, chocking odor.

Mobile Sources of SO_2: SO_2 is emitted during fuel combustion. Mostly from diesel engines as diesel has much more sulfur than gasoline.

SO_2& Your Health: SO_2 exposure generally cause a burning sensation in the nose and throat and difficulty breathing. SO_2 also causes potential respiratory and cardiovascular problems for people who have heart of lung disease or asthma.

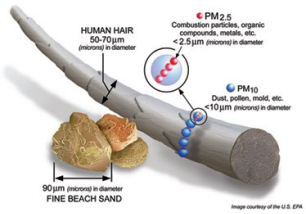
SO_2& the Environment: Many of the potential dangers resulting from the release of SO_2 in the air are directly related to how it reacts with other materials. One danger is the formation of acid rain.

Particulate Matter (PM)

PM in the air includes a mixture of solids and liquid droplets. PM is either directly emitted as primary particles or it forms in the atmosphere from emissions of SO_2, NO_x, NH_3 and non methane volatile organic compounds. Particles come in a wide range of sizes. Those less than 10 micrometers in diameter (smaller than the width of a single human hair) are so small that they can get into the lungs, potentially causing serious health problems.

PM $_{2.5}$ – Are particles less than 2.5 micrometers in diameter.

PM $_{10}$ – Are particles between 2.5 and 10 micrometers.



Mobile Sources of PM: PM is emitted from many man-made sources, including combustion, vehicles traveling on roads and suspending particles into the air, and construction operations.

PM & Your Health: Particles smaller than 10 micrometers in diameter can cause or aggravate a number of health problems and have been linked with illnesses and deaths from heart or lung disease. The health threat is most serious for children, people with heart of lung disease, and older adults (who may have undiagnosed heart of lung disease). PM can also increase susceptibility to respiratory infections and can aggravate existing respiratory diseases, such as asthma and chronic bronchitis.

PM & the Environment: The effects of PM in the environment are complex. Some compounds react with other particles in the air to form reaction products (such as ground level ozone). PM also has the potential to modify the climate through the formation of clouds and snow. Particles contribute to acid deposition and may absorb solar radiation and impair/reduce visibility.

Air Toxics

Air Toxics are also known as "hazardous air pollutants."

Mobile Sources of Air Toxics: Emitted from mobile sources (include benzene, formaldehyde, diesel particulate matter, etc.).

Air Toxics & Your Health: Chemicals in the air that are known or suspected to cause cancer or other serious health effects, such as reproductive problems or birth defects. The health threat is most serious for children, as well as individuals with heart problems, emphysema or other chronic respiratory diseases.

Air Toxics & the Environment: Mobile sources are responsible for direct emissions of air toxics and contribute to precursor emissions which react to form secondary pollutants (ozone and particulate matter).

Visit EPA's Mobile Source Air Toxic page for more information.

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