A SHORT AIR POLLUTION AND DIESEL RETROFIT GLOSSARY

Aftertreatment Device	Engine pollutant emissions are generally reduced by engine modifications, fuel specifications or exhaust gas aftertreatment. An aftertreatment device is a component used to reduce engine pollutant emissions downstream of the combustion chamber. Catalytic converters and particulate traps are examples of aftertreatment devices.
Bio-Diesel Fuel	B20 is the most common biodiesel fuel. It contains a 20% portion of methyl esters developed from vegetable oil or fats mixed with an 80% portion of diesel fuel. A process called transesterification produces methyl esters from the oil. Unrefined vegetable oil is not suitable to add to diesel fuel or be biodiesel. Biodiesel can be combusted in diesel engines with little modification required. The United States Environmental Protection Agency has verified B20 as a retrofit technology.
Catalytic Converter	A catalytic converter consists of a metal housing filled with a hard material, which is covered by a catalytic compound. The catalytic converter in the engine exhaust system breaks down the chemicals in the exhaust and reduces harmful pollutant emissions.
Engine Family	Each group of engines with similar emission characteristics is defined as a separate engine family. Vehicles or engines in an engine family are expected to have similar emission characteristics. A permanent label is affixed to the engine which list the 12-digit engine family classification.
Carbon Monoxide (CO)	Carbon monoxide (CO) is a colorless, odorless and poisonous gas produced by the burning of fuels. 77% of the nationwide CO emissions are from transportation sources.
Emulsified Diesel Fuel	An additive helps suspend the water droplets inside the normal fuel. The water content helps bring about a finer, cloud-like atomization of the fuel mixture during injection into the engine. Lower combustion temperatures and more efficient combustion leads to lower formation of NOx and particulate.
Idling Reduction Technology	Electric power hookups installed on a truck and at a truck stop allow a truck operator to shut off his engine while supplying the power necessary for his truck cabin living quarters. Equipment installation pays for itself within several years for the truck owner (through fuel savings) and the truck stop owner (through power sales).
Nitrogen Oxides (NOx)	Oxides of nitrogen (NOx) are a family of reactive gaseous compounds that contribute to air pollution in both urban and rural environments. NOx emissions are produced during the combustion of fuels at high temperatures. The primary sources of atmospheric NOx include highway sources (such as cars and trucks), nonroad sources (such as construction and agricultural equipment) and stationary sources (such as power plants and industrial boilers). NOx can irritate the lungs, cause bronchitis and pneumonia, and lower resistance to respiratory infections. Oxides of nitrogen are an important precursor both to ozone and acid rain, and may affect both terrestrial and aquatic ecosystems.
Oxidation Catalyst	A type of catalytic converter which converts VOC (volatile organic compounds) and CO (carbon monoxide) to water vapor and carbon dioxide and reduces particulate matter emissions.
Ozone	Ozone (O3) is a photochemical oxidant and the major component of smog. While O3 in the upper atmosphere shields the earth from harmful ultraviolet radiation that comes from the sun, high concentrations of O3 at ground level are a major health and environmental concern. O3 is not emitted directly into the air but is formed through chemical reactions between emissions of volatile organic compounds (VOC) and oxides of nitrogen (NOx) in the presence of sunlight. These reactions are stimulated by sunlight and temperature so that peak O3 levels occur typically during the warmer times of the year. Both VOCs and NOx are emitted by transportation and industrial sources such as

	autos, chemical manufacturing, dry cleaners and paint shops. O3 causes health problems because it damages lung tissue, reduces lung function and sensitizes the lungs to other irritants. Children are particularly vulnerable.
Particulate Trap/Filter	An aftertreatment device which filters or traps diesel particulate matter from engine exhaust until the trap becomes loaded to the point that a regeneration cycle is implemented to burn off the trapped particulate matter. It also reduces CO and HC.
Particulate Matter	Particulate matter (PM) includes dust, dirt, soot, smoke and liquid droplets directly emitted into the air by sources such as factories, power plants, cars, engines, construction activity, fires and natural windblown dust. Very small particles are typical of diesel exhaust. These particles can be carried deep into lungs. Based on studies of human populations exposed to high concentrations of particles (sometimes in the presence of SO2) and laboratory studies of animals and humans, the health effects associated with exposure to PM are serious. They include effects on breathing and respiratory symptoms, aggravation of existing respiratory and cardiovascular disease, alterations in the body's defense systems against foreign materials, damage to lung tissue, as well as premature death. Children are particularly sensitive. Particulate matter also soils and damages materials, and is a major cause of impaired visibility in the United States.
Retrofit	An engine "retrofit" includes (but is not limited to) any of these activities: -addition of new/better pollution control aftertreatment equipment to certified engines - upgrading a certified engine to a cleaner certified configuration - upgrading an uncertified engine to a cleaner "certified-like" configuration - conversion of any engine to a cleaner fuel - early replacement of older engines with newer (presumably cleaner) engines (in lieu of regular expected rebuilding) - use of cleaner fuel and/or emission reducing fuel additive (w/o engine conversion)
Ultra-Low Sulfur Fuel	Current EPA regulations specify that diesel test fuel contain less than 500 ppm sulfur. The national average sulfur content in diesel fuel is about 350 ppm. Typical non-road diesel fuel meets a standard, which sets maximum sulfur level at 5,000 ppm. Typically, the sulfur level of non-road diesel fuel is 3,000 ppm. Significant reductions from these current sulfur levels are necessary in order for many retrofit technologies to provide meaningful emissions reductions. The manufacturers of these retrofit technologies will specify the maximum allowable sulfur level for effective operation of its products. In addition to enabling a wide array of emissions control technologies, the use of ultra-low sulfur alone reduces emissions of particulate matter. Sulfate, a major constituent of particulate matter, is produced as a byproduct of burning diesel fuel containing sulfur. Reducing the sulfur content of fuel in turn reduces sulfate byproducts of combustion and therefore particulate matter emissions. For the purposes of the diesel retrofit program diesel fuel must contain less than 30 ppm sulfur to be considered an ultra-low sulfur fuel. Fuel with less than 15 ppm sulfur will be required in June 2006.
Verification	EPA's Environmental Technology Verification (ETV) program was established to carefully examine and judge the efficacy of a technology. The goal of ETV is to verify the environmental performance characteristics of commercial technology through the evaluation of objective and quality assured data, so that potential purchasers and permitters are provided with an independent and credible assessment. Check EPA's website at http://www.epa.gov/OMS/retrofit/retrofittech.htm for verified technologies.
Volatile Organic Compounds (VOC)	An exhaust and evaporative pollutant of hydrogen and carbon atoms resulting from unburned fuel. VOCs contribute to the formation of ozone which is responsible for choking, coughing, and stinging eyes.