

Diesel Exhaust and Air Quality

Every day millions of diesel-powered trucks, trains and ships transport consumer goods and raw materials throughout our country and abroad. But the productive role of diesel engines in our economy comes with a price. *According to the Washington State Department of Ecology (Ecology), diesel exhaust harms health more than any other pollutant in Washington.* Therefore, a balance must be sought between the economic benefits of diesel engines and their extremely harmful human health impacts.

Who should be concerned about diesel exhaust?

We should all be concerned about diesel exhaust. People come into contact with harmful levels of diesel exhaust in both urban and rural areas, such as near a rail yard, a busy truck stop, or any place near a major road. More than four million Washingtonians live and work near busy roads where diesel exhaust is most common. They are potentially being exposed to harmful levels of diesel exhaust on a regular basis.

Diesel exhaust is made up of tiny, highly toxic particles that penetrate the lungs and remain there indefinitely to create and/or worsen both heart and lung conditions.

Exposure to diesel particles is linked to immediate and long-term health effects, including:

- causing lung cancer
- increasing the risk of heart attack or stroke for those with pre-existing heart disease or circulatory problems
- making healthy children and adults more susceptible to developing respiratory conditions
- causing coughing, labored breathing, chest tightness and wheezing
- irritating eyes, nose and throat

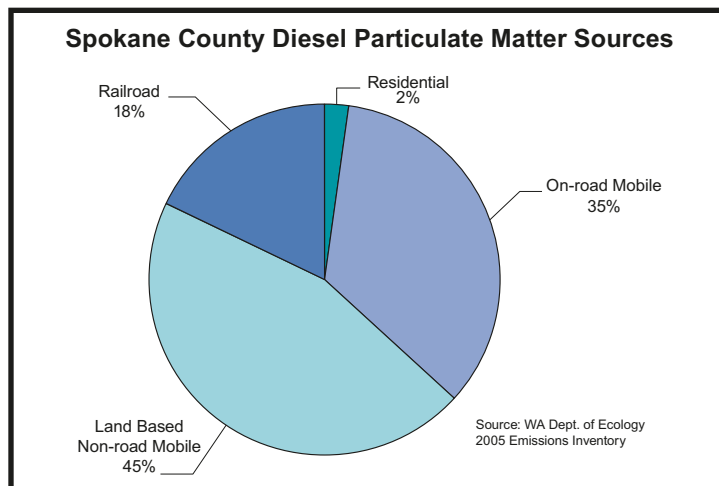
Fine particles also come from sources other than diesel, such as smoke from wood heating, outdoor burning and wildfires, but they are not as toxic as the particles from diesel.

Where does diesel exhaust come from?

Diesel exhaust comes from diesel engines, including farm and construction equipment, generators, cars, trucks, buses and trains. On road vehicle and locomotives account for 97% of the diesel emissions in Spokane County.

Is reducing diesel exhaust worth the cost?

The benefits outweigh the costs of reducing diesel exhaust. For



every dollar spent to reduce diesel emissions, we save \$3 -\$8 in in health care costs and diesel fleet operating and maintenance costs, according to the California Air Resources Board.

What has been done to reduce diesel exhaust?

Under state funding, many public fleets—including school buses, garbage trucks, transit buses—throughout Spokane County have been retrofitted with equipment to reduce emissions. These retrofits have been done mainly on pre-2007 diesel engines. New engines are much cleaner and are not a priority for funding.

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What else needs to be done?

The relatively easy and cost-effective retrofits have been done in our area. What's left to tackle are all the private heavy and light duty vehicles, construction and farm equipment, and locomotives.

Reducing emissions from switchyard locomotives

Even when switchyard locomotives are not moving, their diesel engines are usually kept running. This is done to charge batteries, warm engine fluids and meet other operational needs. This can amount to several thousand hours of idling per locomotive per year. According to Ecology, over five years the average switchyard locomotive burns over 80,000 gallons of diesel fuel from idling alone. This contributes more than:

- 15 tons of nitrogen oxides, a smog-forming pollutant
- 1,000 pounds of cancer-causing diesel particles
- 900 tons of carbon dioxide, a greenhouse gas

Reducing idling will save the railroads money in fuel and maintenance costs, reduce our dependence on foreign oil and improve the health of railroad workers and communities near switchyards.

Cleaner Diesel Fuels

In addition to reducing idling, a variety of strategies are underway in many communities to address diesel emissions.

Cleaner Diesel Fuels

Ultra low sulfur diesel has been available throughout the U.S. since 2006, although retailers are not re-

quired to provide it for on-road engines until December 1, 2010. This fuel contains less sulfur and improves the performance of retrofit technologies, such as the Diesel Particulate Filters. There is a small emission reduction (5-9%) from use of the fuel alone. Starting in 2012, locomotive, non-road diesel engines (farm, construction equipment) and marine vessels must use ultra low sulfur diesel fuel.

Biodiesel is a renewable fuel manufactured from vegetable oils and animal fats. Biodiesel reduces particle emissions, but increases nitrogen oxide emissions. Often, 20% biodiesel is blended with 80% petroleum diesel. This B20 blend can be used in unmodified diesel engines. B20 reduces particle emissions by 10%.

Emulsified diesel is a mixture of fuel, water and an additive to reduce particle and nitrogen oxide emissions. The fuel can be used in any diesel engine. The water reduces the energy content of the fuel resulting in reduction in fuel economy and power. The fuel will stay well mixed, but if a vehicle sits dormant for months, the water can settle and cause problems. It is recommended that school buses phase-out the use of this fuel toward the end of the school year, and reintroduce it in the fall.

Emission Control Technologies

Truck Electrified Parking (TEP) at truck stops provide electrical power through mounted electrical outlets at the parking space. Trucks plug into the outlet instead of idling. Electricity powers the heating, air conditioning, refrigeration units and other electrical equipment. A truck driver can save up to three dollars per hour using the TEP rather than idling,

based on one gallon of gas consumed per hour when idling, \$4 per gallon for diesel fuel and \$1 per hour for the use of the TEP. To use TEPs in Washington or Oregon, trucks need a heavy-duty extension cord to plug into the system, a 120 volt AC electrical heating, cooling or other electrical appliance in the cab, a TEP account and user card or other major credit card. TEPs are in use in the I-5 corridor as well as across the U.S. For locations visit www.shorepower.com/network.html.

Auxiliary Power Units (APU) are small, truck-mounted systems that are integrated into the truck's operating system to allow for independent operation or as a back-up alternative to the main truck engine. APUs allow the operator to heat/cool the truck cab as well as run the refrigeration system. APUs can reduce idling emissions by about 88% and save about \$6,000 in fuel costs, based on \$3/gallon. The technology runs about \$2,000 for small cab heater to over \$7,000 for APU with an inverter to allow use of 110-V applications.

Diesel Engine Retrofits typically work best for model years 1996-2006. There are various types of retrofits:

Diesel Particulate Matter Filter (DPF) is a ceramic device that collects the particles in exhaust. The high exhaust temperature heats the ceramic structure and causes particles inside to break down into less harmful components. The DPF must be used with ultra-low sulfur diesel fuel. Use of regular diesel fuel in DPF could clog the filter. The DPF results in a 60-90% emission reduction when retrofitted and used with ultra low sulfur diesel fuel. A DPF must be cleaned every 100,000 miles.

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Diesel Oxidation Catalyst (DOC) is a stainless steel canister that contains a honeycomb structure, of which the surface area is coated with catalytic metals. The device uses a chemical process to convert pollutants in the exhaust stream into less harmful components. DOCs can reduce emissions of particulate matter by 20%, hydrocarbons by 50% and carbon monoxide by about 40%.

Flow-through Filters or Partial Diesel Particulate Filters use catalyzed metal wire mesh or a metal foil-based substrate with sintered metal sheets to reduce diesel particles. These filters reduce particulate matter by 30-75%. Currently this technology has experienced limited commercial use and may work best on older engines.

Selective Catalytic Reduction (SCR) has been used to reduce nitrogen oxide emissions in trucks, marine vessels and locomotives. SCR uses a metallic or ceramic coated catalyzed substrate. The exhaust passes through the DPF and then through the SCR. Using the SCR in addition to a DPF in diesel vehicles has an emission reduction of 20-30% for particulate matter as well as reducing nitrogen oxides. SCR performance is improved by using ultra low sulfur diesel.

Crankcase Emission Control reduces emissions from turbo-charged diesel vehicles. In most engines, the crankcase is vented to the air, through a basic filter. To improve emission reductions a multi-stage filter is placed on the vent in the crankcase to collect, coalesce and return emitted lube oil to the engine sump and filtered gases are returned to the intake system.

Diesel Multi-Stage Filter (DMF) Muffler uses a two-stage metallic filter to reduce diesel PM emissions up to 60%. Each filter stage consists of alternating layers of a corrugated metal and a porous sintered metal fleece. The catalyst coating reduces PM, hydrocarbons and CO emissions. DMF Muffler kits are available for popular school bus makes including: AmTran, Bluebird, Carpenter, Ford (vans), International and ThomasBuilt.

For more information, including possible funding sources for retrofitting diesel engines, visit these websites:

www.westcoastcollaborative.org

www.ecy.wa.gov and search "diesel"

Install P/V Caps to Reduce Vapor Loss

by Deanna Clarkson, Air Quality Specialist

Pressure vacuum vents, also known as P/V caps, are pressure release devices installed on gasoline storage tank vent pipes at gasoline stations. P/V caps are designed to minimize vapor (Volatile Organic Compounds—VOCs) loss while maintaining a safe pressure differential within the gasoline storage tank. The caps may also protect tanks against water, debris or insects entering the vent pipes. A normally closed poppet in the vent cap opens at pre-determined pressure or vacuum setting to allow the tank to reduce pressure or vacuum to safe levels.

Nearly all gasoline stations in Spokane County are required to use and maintain Stage I vapor recovery systems, also called vapor balance systems. Stage I vapor recovery is designed to control the release of gasoline vapors to the atmosphere when gasoline is delivered to storage tanks. For stations required to use Stage I vapor recovery systems, no delivery of gasoline into the underground storage tanks should be permitted where the vapor balance system is not operated satisfactorily. A P/V vent is an integral part of the vapor recovery system.

With no vent caps present, tank vent pipes present an uncontrolled path for gasoline vapors

to escape to the atmosphere during fuel delivery.

Gasoline vapors that go out vent pipes as vapor emissions add up to product losses for the gasoline operator and air pollution for everyone else. Gasoline evaporation occurs primarily through an equilibrium process: liquid changes to a gaseous state to reach an equilibrium vapor pressure. This results in the vapor space in the fuel delivery truck and the underground storage tank being saturated with gas vapors, which are then vented through the vent pipe if no P/V cap is present.

Example Benefit of P/V Cap

A gas station with a throughput of 1,000,000 gallons/year without a P/V Cap installed:

- ➔ releases approximately 3.5 tons of VOCs annually.
- ➔ loses 2,000 gallons of gasoline per year; roughly \$6,000 at today's prices.

If you have questions about installing P/V caps at your station, call us at 477-4727.



Installing and Operating *Rock Crushers*, other *Portable* or *Temporary* Stationary Sources

What are Portable and Temporary Stationary Sources?

Portable Stationary Source is portable or transportable (excluding non-road engines) and installed and operated at a specific site for a brief period, not to exceed 364 days (i.e., less than 12 consecutive months) and then is **expected to be moved to another specific site and operated for a brief period**. Portable stationary sources may include, but are not limited to, the following: portable rock crushers, portable asphalt plants, portable concrete batch plants.

Temporary Stationary Source is portable or transportable (excluding non-road engines) and installed and operated at a specific site for a brief period, not to exceed 364 days (i.e., less than 12 consecutive months), and is **not expected to operate again in the foreseeable future**. Temporary stationary sources may include, but are not limited to, the following: a temporary boiler, while a permanent boiler is undergoing maintenance; fugitive dust emissions associated with the construction of a new building; non-stationary stump grinders.

When is a NOC or NOI required?

A **Notice of Construction (NOC)** is required by Spokane Clean Air for the first time a portable stationary source is installed and operated at a site in Spokane County. Thereafter, an approved **Notice of Intent (NOI)** to Install and Operate a Temporary Stationary Source is required subsequent to

operation of the portable source in Spokane County. **Note:** For portable sources that have previously received NOCs or NOIs to operate in Spokane county, only a NOI is required to operate at sites in Spokane County.

A NOC may be required for temporary stationary sources, other than non-road engines, that operate in Spokane County, depending on the source type and expected emissions.

In order to determine if a NOC is required for a temporary stationary source, information on the proposed project (e.g., size of equipment, expected length of operation at the site, expected emissions, etc.) should be submitted to Spokane Clean Air well in advance of expected start-up. The agency will review the information and determine if a NOC is required for the temporary stationary source. In order for projects involving temporary and portable stationary sources to receive approval in a timely manner, a complete NOC (if applicable) or NOI application must be submitted to Spokane Clean Air well in advance of the anticipated start date.

With an approved NOI, the temporary source may operate at the site for a limited period of time, not to exceed 364 consecutive days from the date the source is installed at the site (i.e., less than 12 consecutive months). If the temporary source remains at the site for 12 consecutive months

or longer, the source is no longer considered temporary and must obtain an approved Notice of Construction.

What information must be submitted?

Prior to the installation and operation of a temporary or portable source, Spokane Clean Air must receive and approve an NOC or NOI application. The NOC or NOI application should be accompanied by:

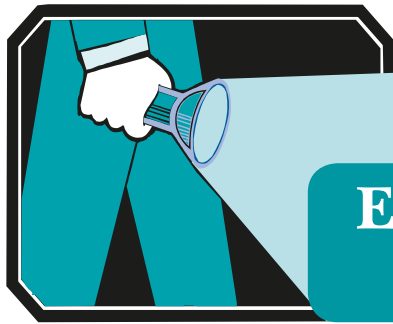
- ➔ detailed schematics of the equipment and layout
- ➔ pertinent environmental information (for asphalt plants this includes a copy of representative source test performed within the last 5 years)
- ➔ the base fee for the project
- ➔ a SEPA Checklist, if applicable

Spokane Clean Air may require further information to demonstrate that the proposed source will meet the regulatory requirements.

For more information about NOC and NOI applications, call us at 477-4727 or visit www.spokanecleanair.org/compliance_resources.asp.



A portable stationary source, such as this rock crusher, is expected to be moved and operated at another site.



Business Spotlight

EnviroStars program expands into the Spokane-area

EnviroStars is a program certifying businesses that protect the environment by properly managing and reducing hazardous materials and waste.

The program launched in the Puget Sound area 15 years ago and has certified over 700 business. The program recently expanded in Spokane under a government and non-profit partnership.

Program Requirements for Spokane EnviroStars

- ★ You are in Spokane County
- ★ You do not generate large quantities of hazardous waste
- ★ You complete a local source control consultation and an EnviroStars checklist
- ★ You are in compliance with regulatory requirements

How to Become an EnviroStar

Schedule a free on-site consultation to review waste management practices and EnviroStars qualifications by calling (509) 847-4337.

Benefits of becoming an EnviroStars certified business:

- ★ Show the community your commitment to protecting the environment
- ★ Attract customers by being green
- ★ Create a safer, healthier work environment
- ★ Increase efficiency, decrease costs

- ★ Reduce regulatory burden
- ★ Strengthen supplier and agency relationships
- ★ Gain access to business assistance resources
- ★ Advertising and promotion

EnviroStars Spokane partners include: City of Spokane Solid Waste, Spokane Aquifer Joint Board, Spokane County, Spokane Regional Clean Air Agency, Spokane Regional Health District, Spokane Regional Solid Waste System, Spokane River Forum and Washington State Department of Ecology. ■

“Environmental awareness is everyone’s responsibility; if we don’t do it, who will? Working with EnviroStars is a very good place to get started.” Jim Kurle, Auto Body Experts, Poulosbo, WA

K & M Unibody of Spokane Valley is one of nine local businesses to date that have earned an EnviroStar certification.

Jim Miller has run his Spokane Valley auto body shop for 25 years. Along with his vast experience in the field, Miller has also experienced technological and regulatory changes that have reduced his business' impact on the environment.

“The environment for workers has dramatically improved since we started. There are fresh air systems for painters and painting in booths that capture particulates, resulting in cleaner air. We are working toward a low- to no-impact on the environment,” states Jim Miller.

Along with becoming EnviroStars certified, K & M Unibody has a good track record of meeting air quality requirements. Running an auto body shop requires a variety of air pollution control equipment. Dust created from any prep work needs to be contained. K & M has two downdraft prep decks that capture any particulate matter in the decks filters. They also have a down draft water wash paint booth, which is designed to capture any paint overspray. They use only high volume low pressure (hvlp) paint guns, and perform regular maintenance to ensure that all air pollution control equipment is working. Congratulations to K & M Unibody!



UPDATE

Spokane Regional Clean Air Agency
3104 E. Augusta Avenue
Spokane, WA 99207

Pre-sort STD
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Air • Quality • Calendar

Nov. 4 Board of Directors meeting, 9:30 a.m., Spokane Clean Air office room, 3104 E. Augusta Avenue. Meeting agendas are available at www.spokanecleanair.org or call 477-4727.

Dec. 2 Board of Directors meeting (details above).

Board of Directors

Rose Dempsey, Chair, City of Spokane Valley
Bonnie Mager, Vice Chair, Spokane County Commissioner
Tom Brattebo, Member-at-Large
Jeff Corkill, City of Spokane Representative
Edward "Chuck" Crockett, Small Cities & Towns Representative

UPDATE is published by the Spokane Regional Clean Air Agency as part of its Compliance Assistance Program. Send your comments to Lisa Woodard, Editor, lwoodard@spokanecleanair.org.



3104 E. Augusta Avenue
Spokane, WA 99207
PHONE: (509) 477-4727
FAX: (509) 477-6828
Web Address:
www.spokanecleanair.org

To add or remove a name from this mailing list, email lwoodard@spokanecleanair.org

Changes: Annual Registration

To improve efficiency and reduce costs, Spokane Clean Air is revising its schedules for invoicing annual registration fees and sending out annual registration forms, as follows:

Annual Registration Fee Billing

As of January 1, 2011, all registered facilities will be sent their 2011 annual billing the first week of January. The registration fee itself is not changing, only the date you are billed. The emission fee portion will be based on the most current information we have from you. Future emission fees will be based on the previous year's annual registration form.

Annual Registration Form (ARF)

Beginning in 2011, all registered facilities will receive their annual regis-

tration forms (ARF) in March. These are the forms you use to report how much material was used or product manufactured, so that we can calculate the air emissions and related fees.

Everyone will now report data from the previous calendar year. So, on the 2011 ARF you receive in March 2011, you will need to report data from January 1 - December 31, 2010.

This schedule change provides consistency and aligns with other emissions and air quality data we gather on a calendar year basis, enabling us to more efficiently and effectively conduct data analysis.

Please contact us if you have any questions or concerns, 477-4727.

Emergency Generators

If you have an emergency generator or are planning to acquire one in the future, please be advised that generators **rated at or above 500 brake horsepower (bhp)** are subject to Spokane Clean Air's registration program.*

Please contact Spokane Clean Air as soon as possible at 477-4727. Our staff will assist you with details and walk you through the registration process.

**Spokane Clean Air's registration program enables the agency to maintain an accurate inventory of air contaminant sources, and to evaluate control strategies necessary to attain and maintain federal, health-based air quality standards.*