



Working Together for Clean Air

www.pscleanair.org



Driving Toward Clean Air with ULSD



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Ultra Low Diesel Fuel Helps Address A Significant Public Health Problem



- Diesel exhaust is not just a nuisance, it's a significant public health problem
- Diesel exhaust is associated with several key air quality challenges
 - Ultra-fine particles (PM 2.5 or soot)
 - Toxic emissions and cancer risk
 - Regional visibility



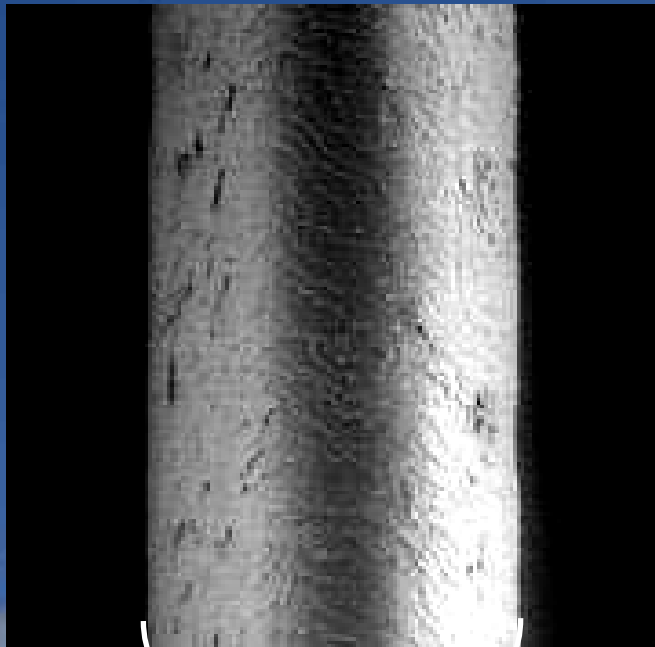
Diesel Exhaust: An Important Source Of Fine Particles



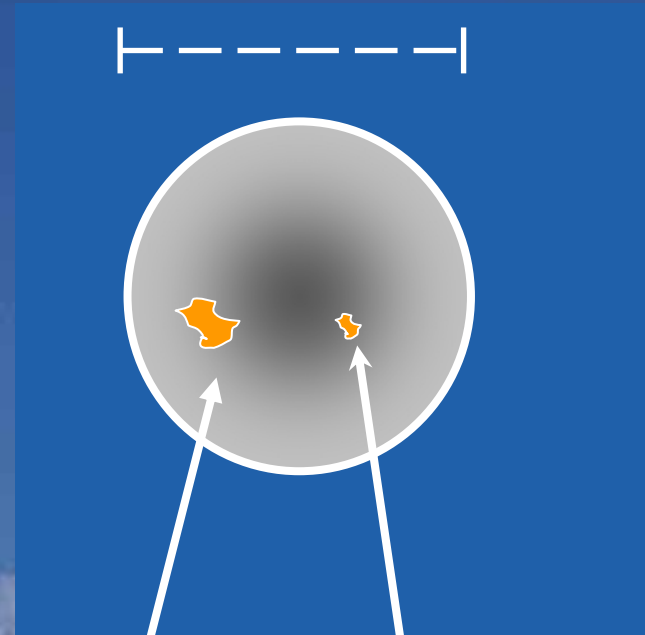
- **Diesel exhaust contains ultra-fine particles combined with toxic substances**
- **The result of incomplete combustion**
- **Ultra-fine particles act like a gas rather than a solid**
- **Ultra-fine particles are invisible and bypass lung defenses**

...a complex mixture of
extremely small solids and liquid droplets

Hair cross section (70 μm)



Human Hair (70 μm
diameter)



PM₁₀
(10 μm)

PM_{2.5}
(2.5 μm)

- **Excess deaths**
- **Increased incidences of asthma**
- **Increased hospital admissions and emergency room visits**
- **Significant increases in lost work days**
- **Lung, eye and throat irritation**



- **An increasing number of studies link diesel exhaust to lung cancer risk**
- **The Los Angeles Air District has identified diesel exhaust as responsible for 70 % of the cancer risk from breathing ambient air**
- **The Los Angeles Study showed average basin-wide cancer risk levels as high as 1, 400 in a million**
- **EPA, California and others have identified diesel exhaust as a probable human carcinogen**

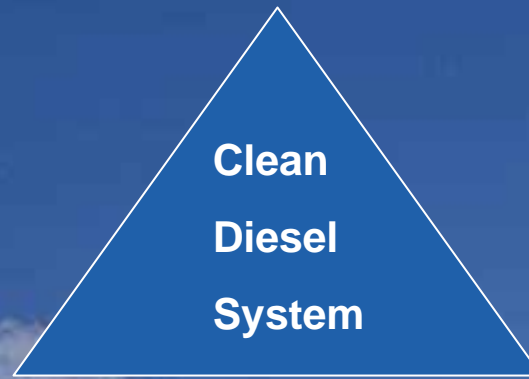
- **A number of Washington cities and counties have high modeled toxics levels attributable to diesel and fuel combustion, based upon EPA's National Air Toxics Assessment and analysis by our Agency**
- **For many fuel and combustion-related toxics we are at some of the highest levels nationally**
- **Local air monitoring verifies those predicted toxic levels in the Puget Sound Region**

Reducing Diesel Emissions: Three Main Components



Advanced engine electronic combustion control, fuel injection systems, and turbochargers optimize performance and low-emissions

Advanced Engine Technology



Cleaner Diesel Fuels

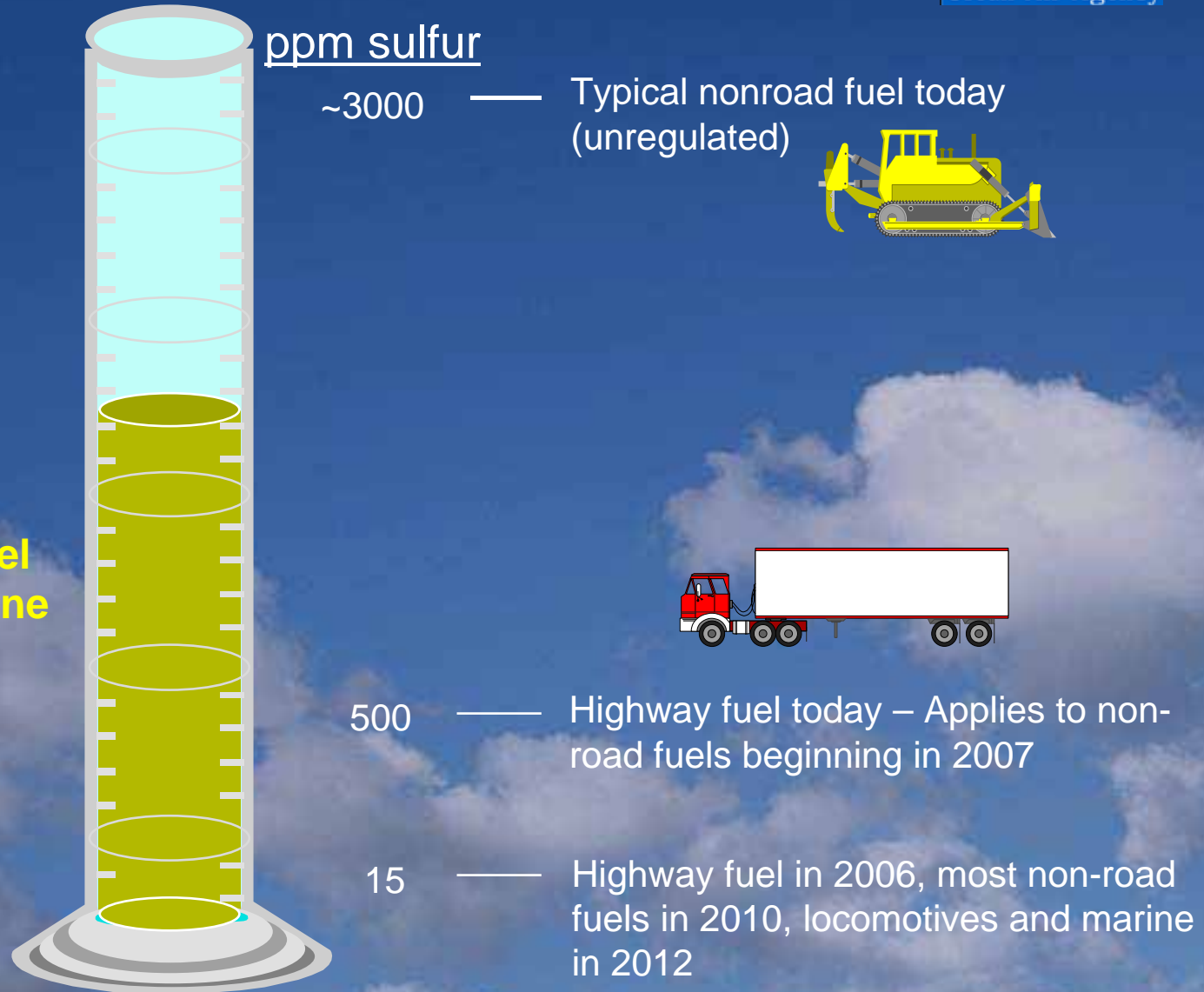
Ultra low Sulfur Diesel Fuel produces lower emissions and enable advanced emissions treatment systems (catalysts and filters)



Emissions Treatment

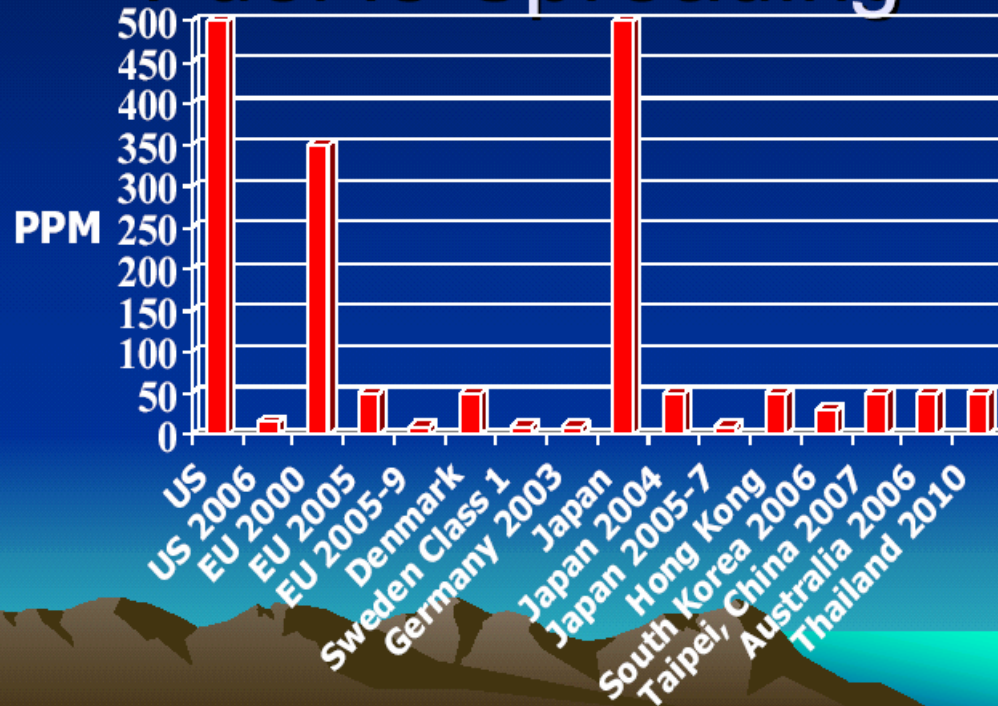
Particulate filters, oxidation catalysts reduce emissions of ozone-forming compounds (NOx and VOCs), trap and eliminate fine particles

Cleaner Diesel Fuel Regulations



- **Reduction of fine particulate emissions**
- **Technology enabler, i.e. makes retrofits work &/or work better**
- **Reduced sulfur induced corrosion – therefore longer maintenance intervals & lower maintenance costs**
- **Slower acidification of engine lubricating oil – therefore longer maintenance intervals & lower maintenance costs**

Ultra Low Sulfur Diesel Fuel Is Spreading



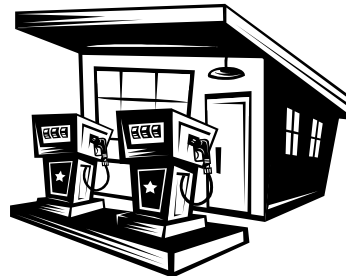
Reference: Manufacturers of Emission Controls Association (MECA) 12/28/04

Emission Treatment: EPA's Voluntary, National Retrofit Program



- EPA standards are becoming increasingly stringent for OEM engines
- Retrofits are necessary due to the longevity of diesel engines
- Designed to improve the emission performance of existing diesel vehicles and equipment
- EPA is building a market for clean diesel—
- Accelerating the delivery of ultra low sulfur diesel fuel—
- Forging business partnerships and relationships—
- Investing EPA resources to accelerate market growth – (significant grant funds)

- A local program developed in collaboration with EPA's National Voluntary Retrofit Program
- Launched in 2001
- Focuses on introducing ultra-low sulfur diesel (ULSD) fuel and retrofits of air pollution control equipment on diesel engines in the four central Puget Sound counties
- Website: <http://www.pscleanair.org/dieselsolutions/index.shtml>



Partners



United States Environmental Protection Agency



King County Metro



The City of Seattle



The Boeing Company



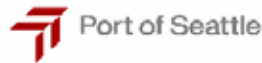
Everett Public Schools & Durham School Services



Kitsap Transit



Cummins



Port of Seattle



Phillips Petroleum (76 brand)



Detroit Diesel



Washington State Department of Ecology



The Diesel Technology Forum



MECA (Manufacturers of Emission Controls Association)



Johnson Matthey

Johnson Matthey



CleanAIR Systems



Community Transit

Community Transit



Puyallup Tribe of Indians



Diesel Solution Partner Commitments



- Over 3,000 retrofits currently
- 25+ million gallons annual ULSD demand
- Increasing biodiesel use
- Fuel price differential under 5 cents per gallon
- Two refiners distributing ULSD inside the urban area



- **Voluntary, collaborative public-private partnership to reduce diesel emissions**
- **Five sectors:**
 - **Agriculture**
 - **Construction**
 - **Locomotives and Rail**
 - **Trucking**
 - **Marine Vessels and Ports**

Website: <http://www.westcoastdiesel.org/>



ULSD, along with OEM standards and retrofits, is a significant opportunity for health & air quality improvements

- ❖ **Toxics reductions**
- ❖ **Fine particle reductions**
- ❖ **Reduced cancer risk**
- ❖ **Visibility improvement**
- ❖ **Reduced acid rain components**