

Diesel Particulate Matter Health Risk Assessment Study for the West Oakland Community: Summary of Final Results

What is the purpose of the diesel PM risk assessment study in West Oakland?

The Air Resources Board (ARB or Board), in cooperation with the Bay Area Air Quality Management District, Maritime Port of Oakland, and Union Pacific Railroad, performed this study to help understand the potential public health impacts from diesel particulate matter (diesel PM) emissions on the West Oakland Community. The initial focus of the study was the Maritime Port of Oakland (the Port), but was later expanded to include locomotives, non-Port marine vessels and trucks and other significant sources of diesel PM emissions in and around the West Oakland Community. The entire study area included the Port, the ocean to the west of the Golden Gate Bridge out to the outer buoys, the inner bay waterway between the Golden Gate Bridge and the Port, and the nearby communities and covered a 100 km by 100 km area (about 3,800 square miles). The purpose of the study is to:

- ✓ Investigate potential cancer risk in the community from various diesel PM emissions from Port operations, locomotives, and significant sources in and around West Oakland
- ✓ Provide information to help evaluate effectiveness of possible mitigation measures

What type of study did ARB do?

The ARB performed a health risk assessment. A risk assessment is a tool that is used to evaluate the potential for a chemical to cause cancer or other illness. A risk assessment uses air dispersion models to estimate concentrations of pollutants in the air. These concentrations are then applied to standard health values or cancer potency factors established by the Office of Environmental Health Hazard Assessment to estimate health risks. For cancer health effects, the risk is expressed as the number of chances in a population of a million people who might be expected to get cancer, if they were to breathe the estimated concentration of pollution over a 70-year lifetime. The number may be stated as "10 in a million" or "10 chances per million". This could be 10 new cases of cancer above the expected rate of cancer in the general population, which is about 200,000 to 250,000 chances in a million (one in four to five people) for all causes of cancer.

What the West Oakland Risk Assessment Does	What the West Oakland Risk Assessment Does Not Do
Predicts health impacts over a large population using computer models	Does not collect health information on individual West Oakland residents or Port workers
Looks at diesel PM	Does not look at every toxic air pollutant
Based on 2005 (annual) exposure data	Does not predict highest daily concentration
Predicts health impacts from long-term exposure	Does not predict health impacts resulting from short term exposure (hourly, daily)
Identifies sources that cause the highest risk from diesel PM	Does not list control actions to be taken
Uses estimated diesel PM concentrations calculated from computer models	Does not monitor for diesel PM in the community because there is no method to directly measure diesel PM

Why is ARB concerned about diesel PM?

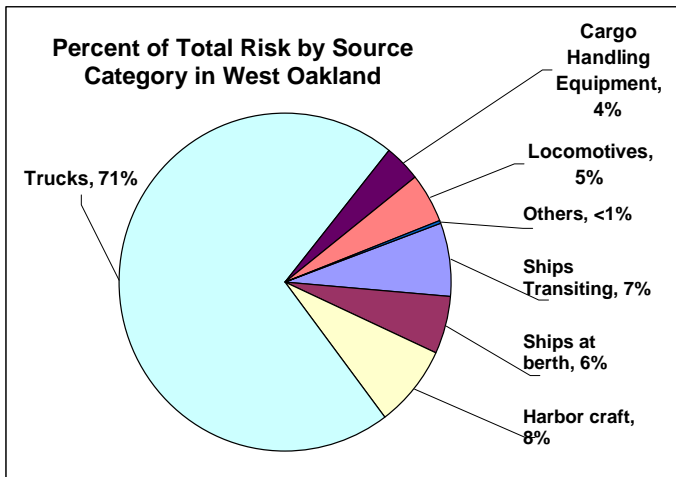
Diesel engines at ports, including ships, cargo handling equipment, locomotives, and trucks, emit a complex mixture of air pollutants, composed of gaseous and solid material. The solid particles in diesel exhaust, which at times may be visible, are known as particulate matter, which includes carbon particles or "soot". In 1998, ARB identified diesel PM as a toxic air contaminant based on its potential to cause cancer and other health problems. Health risks from diesel PM are highest in areas of concentrated emissions, such as near ports, rail yards, freeways, or warehouse distribution centers. Exposure to diesel PM is a health hazard, particularly to children whose lungs are still developing, and the elderly who may have other serious health problems. Diesel PM is also a large component of particulate matter pollution in many cities. The health impacts of particulate matter (PM10 and PM2.5) have been studied and exposure to it is associated with a variety of health effects, including premature death and a number of heart and lung diseases.

What are the results of the risk assessment in West Oakland?

The study was separated into three parts: Part I - the Port, Part II - the Union Pacific Rail Yard, and Part III - the West Oakland Community. This was done to better understand the impacts of the Port, locomotives, and other significant sources of diesel PM in and around the West Oakland community, including non-Port related marine vessel traffic in the Bay and trucks on freeways. The results of the risk assessment on the West Oakland Community are shown in the table to the right.

The percent contributed to the total risk by each source category is further broken down and shown in the pie chart below. As shown, the largest contributor to the risk is from diesel trucks. The major portion of this risk came from the diesel trucks on the freeways surrounding West Oakland.

Part of Risk Assessment	Average Potential Cancer Risk Per Million in West Oakland
Part I – Port of Oakland	190
Part II – UP Rail Yard	40
Part III – Sources in and around West Oakland	950
TOTAL	1180



What are the results of the health risk assessment on the larger study region?

The results of the risk assessment show a very large area impacted by the diesel PM emissions. The regional potential cancer risk showed an area of nearly a half million acres with over three million people having a potential elevated cancer risk of more than 10 chances in a million due to exposure from diesel PM emissions from Port operations.

What non-cancer health impacts did the health risk assessment show?

Non-cancer impacts can be estimated on a larger, regional basis using epidemiological studies. The ARB evaluated the non-cancer health impacts resulting from the Port-related diesel PM emissions. For the entire study area, the results showed that annually there would be potentially 18 premature deaths (out of a total population of three million age 30 and older), 290 asthma-related attacks, 2,600 days of work loss, and 15,000 minor restricted activity days from Port-related activities. In a report by the ARB, it is estimated that diesel PM contributed to 1,200 premature deaths statewide in 2005, with about 160 premature deaths in the greater Bay Area.

What is ARB doing about these risks?

The ARB adopted statewide regulations that will significantly reduce the emissions from cargo handling equipment, transport refrigeration units, truck idling, off-road diesel equipment, harbor craft, ship main and auxiliary engines and boilers, port drayage trucks, and ships at-berth (shore side power). The ARB will propose an on-road private fleet regulation for diesel trucks in late 2008. The ARB will continue to explore ways to obtain additional reductions from truck, ships, and port-related emissions. ARB has allocated \$140 million from Proposition 1B for cleaner equipment to reduce freight emissions in the Bay Area.

How much will these regulations reduce risk in West Oakland?

By 2015, we expect the regulations adopted by ARB to reduce the overall population-weighted or average risk by about 80 percent. As growth increases in the future however, it is estimated that the reductions achieved from the regulations will provide about a 75 percent reduction in risk by 2020. The ARB will be working with all stakeholders to aggressively seek additional opportunities to reduce diesel PM emissions and potential health risks.

For more information:

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