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The Cancer in Portland's Air

TOPICS: Air Pollution Air Toxics Chromium VI Climate Change Columbia River Crossing Crc Environmental Justice EPA Freeway Global Warming I-5 Interstate 5 Mapping Pollution Portland Traffic

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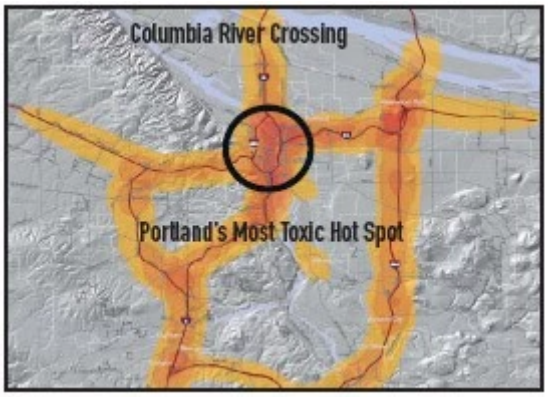

PORTLAND'S HOTTEST TOXIC HOT SPOT — Toxic pollution in Portland is worst near the Rose Garden arena, Portland State University Professors Linda George and Vivek Shandas found in their study, "Spatial Patterns of Air Toxins in the Region," PSU 2009.

This is part 4 of Cascadia Times' continuing series on the Columbia River Crossing and air pollution. Read the series **introduction**, and articles on **induced traffic**, **lagging traffic counts**, **the cancer in Portland's air**, **an environmental injustice**, **ESCO and industrial air pollution, global warming and the CRC, a look to the future, and the media's role.**

Portland's air is polluted with dangerous levels of 14

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different carcinogens. Click to download maps of Portland's air toxics.

The Columbia River Crossing says its project won't harm the health of Portlanders, despite its projection that cross-river traffic will increase by 50,000 vehicles per day by 2030.

Its finding of no impact seems startling, given that motor vehicles emit 77 percent of the toxics in our air, and pose a serious health risk to the residents of Portland, according to the Oregon Department of Environmental Quality.

Other sources of air toxics include industry, home heating with wood, and a wide variety of chemicals used by businesses and people. Because there are no federal standards for individual air toxics, the DEQ has established a health-based benchmark for each of the 16 air toxics that are modeled at levels high enough to potentially harm public health.

Air toxics are pollutants known, or suspected, to cause cancer or other serious health problems. Children, older adults or people with asthma, lung or heart disease may be more sensitive to the effects of air toxics.

The DEQ estimates that 14 of the 16 air toxics could cause one or more people in Multnomah County to develop cancer sometime in his or her lifetime if exposed continuously. Two other compounds are possibly not carcinogenic, but have been modeled at levels thought to be high enough to harm brain and lung functions.

Despite the expected 50,000-car increase in traffic, the CRC says that emissions of air toxics from traffic "would be substantially lower" in the future.

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Any emission reductions that occur, however, will have nothing to do with the bridge and freeway expansion project.

In the long run, the health of Portlanders would be better without the bridge, if other steps are taken to discourage traffic, such as the institution of tolls and light rail to Vancouver and the use of traffic demand management tools.

The CRC analyzed its potential environmental impacts in 2008, but the Environmental Protection Agency said the CRC provided too little information about the health risks posed by pollution emitted by vehicles using its project.

“We believe that the Draft EIS (Environmental Impact Statement) needs to include additional information on the actual air quality effects of the project,” the EPA said.

That information is available. Due to recent advances in computer modeling of air toxic pollution, the DEQ has been able to estimate the number of excess cancers potentially caused by Portland’s toxic pollution.

After reviewing the CRC’s environmental studies, the EPA concluded that the CRC project “has the potential to exacerbate conditions that are currently affecting human health and well-being in the project area.”

The EPA chided the CRC for providing "no analysis or disclosure of near-roadway pollutants." Near-roadway pollutants are those that fall within about a quarter-mile of the freeway, and are associated with most health problems from air toxics.

A new DEQ computer model has estimated that there could be up to 273 extra cancers in 2017 in people exposed to the 14 carcinogens found at levels above benchmark concentrations in Portland air.

More than three-fourths of this pollution comes from cars.

The CRC says that Portland's air will get less toxic over time as new EPA rules requiring cleaner fuels and cleaner engines take effect. These changes would lower the risk level by 72 percent through 2050, according to the Federal Highway Administration but are likely to still be high enough to pose unacceptable cancer risks to Portlanders.

Those risks would exceed the health-safety goals of the Clean Air Act by a wide margin — even after taking the future emission reduction benefits of cleaner fuels and engines into account.

However, this analysis may underestimate the CRC's potential health impacts on Portland. Some, if not all, of the pollution reduction benefits that result from cleaner fuels and engines required by the 2007 EPA rule have already been counted by the DEQ, says Andy Ginsberg, manager of the DEQ's Air Quality Division.

As a result, the benefits of cleaner cars in the future may be less than the CRC predicts.

"Since the 2007 rule is already adopted and phasing in, we already counted its benefit in the base 2017 forecast," Ginsberg said. "EPA has done a great job of setting fuel and engine standards for a wide range of engines, and we definitely want to account for that in determining the additional reductions needed."

The CRC's claim that it will do no harm stems in part from a dispute it had several years ago over a 2006 DEQ study, the Portland Air Toxic Assessment (PATA).

In its Draft Environmental Impact Statement of 2008, the CRC said it was ignoring the health-impact results of the PATA study because they were "not accurate enough to evaluate the potential health risks associated with individual transportation projects."

But now, the DEQ is using a new computer model that is more advanced than PATA. The new model, known as the Portland Air Toxic Solutions (PATS), was created for the dual purposes of estimating the health risks of exposure to Portland's air, and to create a plan to clean it up.

Not everyone believes the PATA study was useless.

Two Portland State University professors used the PATA study to identify a massive toxic hot spot located near the Rose Garden Arena in North Portland, a few miles south of the site of the proposed CRC project. The hot spot, located near the Rose Garden arena between the Marquam and Fremont bridges along Interstate 5, would be made even more congested by the CRC, according to URS, a consulting firm hired by the city of Portland to review the CRC project.

That toxic hot spot is indicated by the reddish hues inside the black circle in the GIS map above.

The two PSU professors, George and Vivek Shandas, explained that they had examined the PATA data after reviewing studies that associated traffic with dirty air and with health problems in freeway-dominated Los Angeles.

"Children living near high-traffic areas in Los Angeles suffered long-term damage to lung tissue and contracted respiratory illnesses," they wrote in a paper recently published by Portland State University.'

By drawing on traffic data and the DEQ's PATA study, the two professors assessed the importance of automobile

traffic in creating high concentrations of toxic air pollutants at specific locations,

The PATA study found that the health risk of breathing toxic air in Portland varies significantly from one part of the city to another.

In its PATA study, the DEQ analyzed land use, topography, and weather data to find out where polluted air is most likely to collect in Portland, and cause diseases such as cancer after a lifetime of exposure. After running the PATA data through a computer model, George and Shandas found that the most unhealthy places to live are located within a quarter mile of a freeway.

"The PATA study presents an extraordinary opportunity to think about how the creation of new information can help us better plan our cities, but it also challenges us to think about the impacts of the choices we make," the PSU professors wrote in their 2009 paper, "Periodic Atlas of the Metroscape."

But the CRC's proclaimed inability to make use of the PATA results to "evaluate the potential health risks associated with individual transportation projects," didn't prevent the two professors from using the same data to make the exact kind of evaluation.

The CRC says that it expects that by 2030, toxic air emissions from Portland traffic will be "substantially lower" than they are now. It bases that claim in large part on EPA rules that will require cleaner fuels and cleaner cars in the future.

The EPA's rules would reduce emissions from traffic by 30 percent for carbon monoxide; 70 percent for nitrogen oxide; 50 percent for volatile organic compounds, a component of smog; and 90 percent for tiny particles in the air that are dangerous to health when lodged in the lungs.

But the CRC analyzed only 6 of the 16 toxic carcinogenic compounds that the PATS model found exceed Portland's

health-safety benchmarks. The CRC predicted a 50 percent reduction in benzene, 1,3-butadiene, formaldehyde, and acrolein; and a 95 percent reduction in diesel particulate emissions.

Emission reductions for acetaldehyde, another carcinogen, are estimated to be about 10 percent. As a group, it said emissions from these six air toxics would see a 72 percent reduction.

Using the Federal Highway Administration's formula to calculate emission reduction benefits resulting from cleaner fuels and engines, the DEQ's estimation of 273 additional potential cancers would be reduced significantly, but the risk would still be high enough to violate the health-safety goals of the federal Clean Air Act.

PSU Professors George and Shandas say that the DEQ's air toxic studies should trigger the creation of "health impact assessments" that can assist local governments in examining how decisions affecting land uses at any one specific location will affect human health. Such tools would help decision makers, such as those assessing projects like the CRC, find new ways of thinking about human health impacts stemming from their projects.

The CRC, in a technical report, said, "PATA results used state-of-the-art dispersion techniques and provide a useful planning tool for DEQ and the public to identify general levels of health risk and the sources of associated pollutants."

However, the CRC found fault with several aspects of the PATA study involving measurements of acetaldehyde, acrolein, benzene, diesel particulates, 1,3-butadiene and general uncertainty.

"These general issues regarding accuracy do not negate the usefulness of the PATA as a planning tool," the CRC said.

"Available technical tools do not enable prediction of the project-specific health impacts resulting from the emission changes associated with the I-5 CRC project," it said.

Nevertheless, the EPA urged the CRC to do an air toxics analysis similar to the one performed by George and Shandas, using the same rejected dataset.

The EPA said the CRC should look closely "for near-roadway concentrations of, human exposures to, and potential health effects from air toxics, diesel exhaust and particulate matter."

One of these near-roadway toxics is the known human carcinogen benzene.

The EPA said it was dissatisfied with the CRC's failure to identify susceptible individuals and populations, and to propose no mitigation for health effects.

The EPA also noted that the DEQ's data proves "that there are tools available for this type of analysis."

The Multnomah County health division voiced similar concerns. "Traffic volumes in 2030 and beyond are likely to affect human health through air quality, noise pollution, obesity, and unsafe conditions," the county said.

It acknowledged that although new fuels and emission control technologies will greatly reduce particulate matter in newer engines, older diesel vehicles will continue to pose a health risk.

The county also quoted a report by the Health Effects Institute (HEI), a consortium of automakers and the EPA, that said alternative fuels and emissions control technologies being adopted "may themselves contribute to increases in other mobile source air toxics (MSATs) and particulate matter.

The county said that emissions of acetaldehyde and formaldehyde could increase with increased reliance on alternative fuels.

With the help of an outside advisory board, the DEQ's PATS project is seeking ways to reduce the number of estimated cancer cases attributed to toxic air through 2017 from 273 to just 1, which would be enough to comply with the health-safety goals of the federal Clean Air Act.

"Our goal is no more than 1 in a million excess cancers from each air toxic, so these numbers result in a need for an air toxics reduction plan," Ginsberg said. "Keep in mind that the background cancer rate is about 1 in 3 (which means about 200,000 lifetime cancers in Multnomah County from all causes."

The DEQ estimated and then mapped the cancer risks for each of the 16 compounds that it has identified as exceeding health-safety benchmarks in Portland. All but two of the compounds are known or suspected to be carcinogenic (see page 9).

Ginsberg warned against reading too much into the estimations of cancer risk. He said the DEQ estimates overall probabilities for large groups of people, and "can't be used to project the number of cancers that will actually occur in a given place."

Moreover, he emphasized that the data represents "probabilities and not predictions."

The maps identified several areas that exceed benchmarks by more than 10 times.

For example, the PATS study found that risk factor for benzene is 16, meaning that it estimates that 6 excess cancers in Multnomah County could occur as a result of a lifetime exposure to the pollutant. For formaldehyde, PATS estimates a risk factor of 165, based on a proposal issued by EPA scientists that has yet to be officially adopted as a benchmark.

Ginsberg said that the benchmarks have "built in safety-factors" which means that just being over a benchmark "does not mean there is a health emergency, but rather means that it is time to take action to prevent long-term health effects."

Although the PATA results were available to the CRC when it conducted its environmental impact analysis, the PATS computer model was not.

However, the CRC protests the use of PATS data to make estimatations of specific numbers of cancers, and in fact denies that the DEQ has done so, despite its ongoing effort to estimate the cancer risk from exposure to air pollution and to reduce that risk to an acceptable level.

"DEQ has not predicted or estimated a specific number of cancers," she said in an email. "The U.S. EPA methods that DEQ uses to estimate cancer risk do not predict and cannot be used to predict actual incidences of cancer.

"Since a population is very, very unlikely to be exposed continuously for a lifetime to a constant concentration of an air toxic, the risk estimates are really best used to compare one pollutant to another and not to make predictions about the actuality of cancer cases," Putney said.

However, as the maps on the next two pages illustrate, it is hard to find any location in Portland where a person would not be continously exposed to to a constant concentration of carcinogens.

Another type of traffic-related pollution that goes unaddressed by the CRC in its environmental impact studies is the emission of something known as ultrafine particles. These are tiny pollutants that measure just a few nanometers across, and can cause stroke or cardiovascular disease because of the ease by which they can enter the bloodstream and cross over into the brain.

Ultrafine particles are not regulated by either the EPA or the DEQ, George said. These agencies, however, do have

possible ultrafine regulations in their sights. Scientists have zeroed in on hybrid cars, otherwise thought to be a clean mode of transportation, as a source of ultrafine emissions.

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