

## Microsoft Columbia Data Center Expansion

Microsoft's Columbia Data Center operates on a 70-acre site on the outskirts of Quincy, Wash. Data centers house the servers that provide e-mail, manage instant messages, and run applications for our computers.

Microsoft has applied to the Washington Department of Ecology (Ecology) for a permit called a "notice of construction order" (NOC). An NOC is required when industries upgrade or modify their equipment. Its purpose is to protect air quality. Microsoft's NOC application would allow them to install and operate 13 additional diesel-powered backup generators to support expanded operations.

### Ecology's review of the requested permit

Ecology regulations require us to carefully consider the potential health effects of toxic air pollutants coming from new or expanding industries or facilities. The NOC is Ecology's tool for evaluating health risks.

As part of the NOC, Ecology reviewed Microsoft's emissions of toxic air pollutants to see if they might be a health concern. Ecology found that only diesel engine exhaust needed a closer look.

### Health effects of diesel engine exhaust

Diesel engine exhaust contains very small particles. When breathed, these tiny particles can easily make their way deep into a person's lungs. Studies show this can cause many health problems, including:

- Inflamed and irritated lungs and breathing passages
- Irritated eyes, nose, and throat
- Coughing, chest tightness, and wheezing
- Difficulty breathing
- More severe allergic reactions
- More asthma attacks and more severe symptoms of asthma
- Heart attack and stroke in people who already have heart disease
- Lung cancer and other forms of cancer

#### WHY IT MATTERS

Microsoft needs an Ecology permit to install more diesel-powered generators that emit diesel exhaust.

Diesel engine exhaust is a toxic air pollutant that can cause serious health problems. As part of the permit process, Ecology has reviewed Microsoft's emissions of diesel engine exhaust and other air pollutants to see if they are a health concern. This focus sheet gives information about Ecology's review.

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- Higher chance of lung infections
- Male infertility
- Birth defects
- Reduced lung growth in children

The amount of diesel exhaust particles that comes from Microsoft's diesel generators is not predicted to be enough to cause the health effects listed above.

## **Ecology's evaluation of Microsoft's diesel engine exhaust**

### **How the evaluation was done**

1. Ecology's air quality scientists used computer models to estimate where the wind would carry the particles coming from Microsoft's diesel generator exhaust.
2. Ecology's toxicologists reviewed the information from computer models. Toxicologists are scientists who specialize in understanding how pollution and chemicals affect people's health.
3. The toxicologists used the information from computer models to predict the amount of exhaust particles that could be in the air where people live and work outside Microsoft's property. They focused on areas closest to the Columbia Data Center because people in those areas are mostly likely to be exposed to the greatest amount of airborne particles added by Microsoft's new diesel generators.
4. Toxicologists then used risk assessment (see the heading "Risk assessment" below) to estimate potential health problems. They based these estimates on the predicted amounts of exhaust particles in the areas studied.

### **Sources of diesel engine exhaust particles included in the evaluation**

The toxicologists looked at the potential health effects of diesel engine exhaust particles from:

- Microsoft's 13 new generators;
- other sources of diesel engine exhaust particles in the area, such as trucks on highways, trains, and the large diesel generators at other data centers in Quincy; and
- all sources of diesel engine exhaust in existence both before and after the expansion project.

## **Risk assessment**

### **What is risk assessment?**

Scientists use risk assessment as a tool to estimate increased health risks. A risk assessment identifies increased human health risks before people actually get sick so we can do something to prevent illness.

Risk assessment is best used as a ruler to help us decide which concerns and issues are the most important in protecting peoples' health. Risk assessment can't predict rates of a certain disease in an exposed community. However, it is a good tool for estimating potential risk based on current knowledge and many assumptions. Many of the assumptions used to assess risk overestimate risk to be sure our regulatory decisions help protect human health.

#### What the risk assessment found

**If Microsoft does not expand:** Ecology's scientists estimated that if Microsoft does not expand, the risk from diesel exhaust particles for a person who lives near the Columbia Data Center is about 41 per million, or four per 100,000. This means that if one million people lived close to the Columbia Data Center, 41 people might be expected to get cancer because of breathing diesel exhaust particles.

**If Microsoft expands:** When Ecology's scientists looked at the risk that might be caused by the expansion project itself, they estimated that another two people in one million might get cancer. If one million people lived close to the Columbia Data Center, this would mean a total of 43 people might be expected to get cancer because of breathing diesel exhaust particles.

**If Microsoft expands and limits fuel use:** Microsoft offered to voluntarily reduce the amount of diesel fuel used by the generators. They did this by cutting permitted hours of operation by more than half. If Microsoft did not do this, the cancer risk would obviously be higher after the expansion. When Ecology calculated what this meant for risk of cancer, we found that the estimated risk decreased to 30 in one million, or three in 100,000. If one million people lived close to the Columbia Data Center, 30 people might be expected to get cancer because of breathing diesel exhaust particles. **This is actually lower than the risk before the expansion.**

#### Results of the evaluation

Toxicologists generally consider a rate of 10 additional cancers in one million people to be the point that would cause higher concern. The U.S. Environmental Protection Agency has determined that acceptable health risk can range up to 100 additional cancers in one million people exposed to a cancer-causing chemical. The Microsoft expansion could potentially cause two additional cancers in one million people. With Microsoft's voluntary limits in operation, the risk decreases to be even lower than the risk before the expansion. As a result, the study showed that Microsoft's backup diesel generators will typically not emit enough diesel exhaust particles to cause health problems.

#### What does health risk really mean?

The U.S. Centers for Disease Control and Prevention (CDC) estimates that about four out of every 10 Americans will get some form of cancer in their lifetime. We could say that just by living in the U.S., a person has nearly a 50-50 chance of getting cancer. If we add the chance of cancer from living near the newly expanded Columbia Data Center, the odds of getting cancer barely rise at all.

Another way to think about the risk of cancer in Quincy caused by diesel exhaust particles is this: If everyone in Quincy (about 5,000 people) lived near the Columbia Data Center and all were exposed to diesel exhaust particles, the mathematical risk shows that less than one person (0.15 persons) would get cancer from diesel exhaust particles over a lifetime of 70 years. Since it doesn't make sense to talk about cancer in terms of "less than one person," we have to use a larger population, such as one million people, so that the risk has some meaning.

Compared to the normal risk of cancer that everyone in the U.S. has, the estimated increased risk is very small. Cancer is due to many factors in addition to pollution, such as lifestyle, age, and exposure to viruses and chemicals. The amount of risk that a person might tolerate is not the same for everyone because each person has a different opinion about how safe they think they should be.

### **How sure are we about these risk estimates?**

Ecology's estimate of increased cancer risk is not exact. Several factors can't be known for certain:

- The amount of diesel exhaust particles used in our risk assessment is an educated guess. Because we don't know exactly how much diesel exhaust particles will be emitted, Ecology used a high-end estimate so that we don't underestimate emissions.
- We don't know how often people might be exposed to diesel exhaust particles coming from the Columbia Data Center, because people move around. We also don't know exactly where pollutants will go once they are emitted, but we used historical records of weather and wind to make an educated guess.
- We assume that low level exposure to diesel exhaust particles results in a low increased risk for cancer; however, the increased risk of cancer might actually be zero. We are fairly certain that the actual risk of getting cancer from diesel exhaust particles produced by the Columbia Data Center is less than what we've estimated. But we want to make sure we don't underestimate the risk when we make decisions based on health risk.

For more information, see Ecology's report, "Concerns about Adverse Health Effects of Diesel Engine Emissions" available online at <http://www.ecy.wa.gov/pubs/0802032.pdf>.