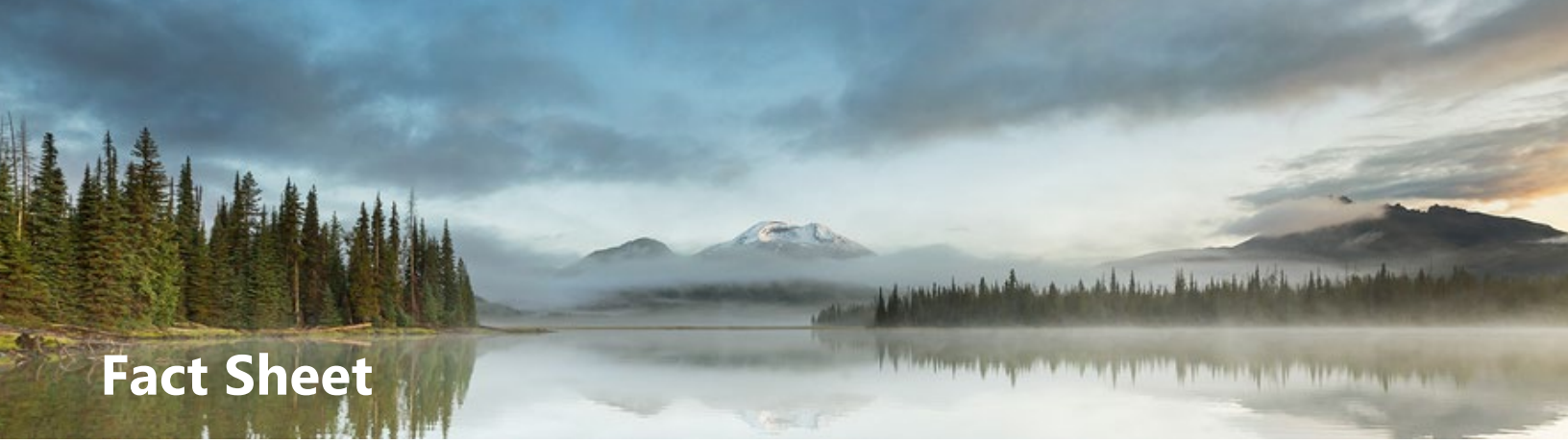

How does Cleaner Air Oregon protect against noncancer health risk

The Cleaner Air Oregon program assesses both cancer and noncancer health risks to the public from exposure to Toxic Air Contaminant emissions from commercial and industrial facilities. This document provides information on how noncancer risks are assessed and regulated under the CAO program. For more information on noncancer health risks please see the Cleaner Air Oregon: Excess Cancer Risk Fact Sheet.

What is a noncancer health risk?

A noncancer health risk is the risk of getting sick with something that is not cancer. Noncancer health effects from breathing Toxic Air Contaminants may include breathing problems, heart disease, liver disease, impaired brain development, infertility, premature birth, and birth defects. The impact on health can range from a cough to heart attack and death. Whether a person experiences health effects from breathing a Toxic Air Contaminant depends on how long the contact lasted, the type and amount of contaminants in the air, how often they breathe it, a person's general health, and inherited (genetic) factors.

How is noncancer health risk measured?

Noncancer health risk is evaluated using a Hazard Index (HI). Scientists calculate an HI to understand the risk to people who breathe multiple chemicals at one time. An HI groups chemicals that affect a single part of the body. For example, one HI would group all chemicals that affect breathing, and a separate HI would group chemicals that affect brain development. An HI is only used to measure noncancer risk.

How is a Hazard Index created?

$$\text{HAZARD INDEX} = \frac{\text{Chemical 1: Concentration in air}}{\text{Health protective level}} + \frac{\text{Chemical 2: Concentration in air}}{\text{Health protective level}} + \frac{\text{Chemical 3: Concentration in air}}{\text{Health protective level}} + \ldots$$

An HI is calculated by comparing the amount of each chemical present in the air (concentration) with the amount of each chemical that is not expected to harm health (health-protective levels). Toxic Air Contaminants that cause noncancer health effects have health protective levels, or thresholds, where negative effects are not expected to occur at or below that level. The health-protective levels for each chemical are based on information developed by federal and state agencies (for example, the Agency for Toxic Substances and Disease Registry and California's Office of Environmental Health Hazard Assessment).

Translation or other formats

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What does a Hazard Index mean for health?

An HI that is at or below one means a person exposed to a facility's emissions is not expected to experience health effects. An HI greater than one means a person exposed to a facility's emissions may experience health effects. The greater the HI number, the greater the potential risk to health. For example, an HI of three means that exposure to a facility's emissions is three times the level that is not expected to harm health. An HI of five means that exposure to a facility's emissions is five times the level that is not expected to harm health. The higher the number, the higher the potential risk.

How does a Hazard Index protect sensitive populations?

An HI considers scientific uncertainty around safety, particularly in sensitive populations. Often the exact level of exposure that causes health effects in people is unknown because: (1) experiments are rarely conducted on people; (2) science experiments can only reflect the doses tested; and (3) different people have different sensitivities to the same dose. The greater the scientific uncertainty around the level of harm, the more scientists add safety buffers that provide greater protections of public health when setting the health protective levels.

How does Cleaner Air Oregon regulate noncancer risk?

In the CAO program there are different risk thresholds for cancer and noncancer risk that could require a facility to limit risk, notify the nearby community of these risks, or reduce risks by installing controls or limiting operations. These thresholds are called Risk Action Levels, or RALs. These RALs are different for new and existing sources under the CAO program.

For new sources, the RAL for noncancer risk is set at an HI of one – this means that DEQ will not issue a permit where the noncancer risk exceeds an HI of one. For existing sources, the rules are more complicated because the Oregon legislature allowed DEQ to set more stringent RALs for chemicals that "are expected to have developmental human health effects associated with prenatal or postnatal exposure, or other severe human health effects." For these chemicals, the existing source noncancer RAL where DEQ can require risk reductions is set at an HI of three, for all other chemicals this RAL is set at an HI of five. If an existing facility emits a mixture of these chemicals, a Risk Determination Ratio is used to assess the risk.

The Cleaner Air Oregon Risk Action Levels fact sheet provides more information on the cancer and noncancer Risk Action Levels, and the risk reduction requirements for facilities.

Program name and contacts

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