

ON THE AIR

Winter
2010-11

A Newsletter about
Clean Air. Provided
by Spokane Regional
Clean Air Agency.

Temperature Inversions & Air Quality

If you've ever tuned-in to a television weather report, you may have heard the phrases "thermal inversion" or "temperature inversion" used from time-to-time. So, what is a temperature inversion and how does it affect air quality? We went to the National Oceanic and Atmospheric Agency and here's what we learned.

On most days, the temperature of air in the atmosphere is cooler the higher up in altitude you go. This is because most of the sun's energy is converted to sensible heat at the ground, which in turn warms the air at the surface. The warm air rises in the atmosphere, where it expands and cools.

Sometimes, however, the temperature of air actually increases with height. The situation of having warm air on top of cooler air is referred to as a temperature inversion, because the temperature profile of the atmosphere is "inverted" from its usual state.

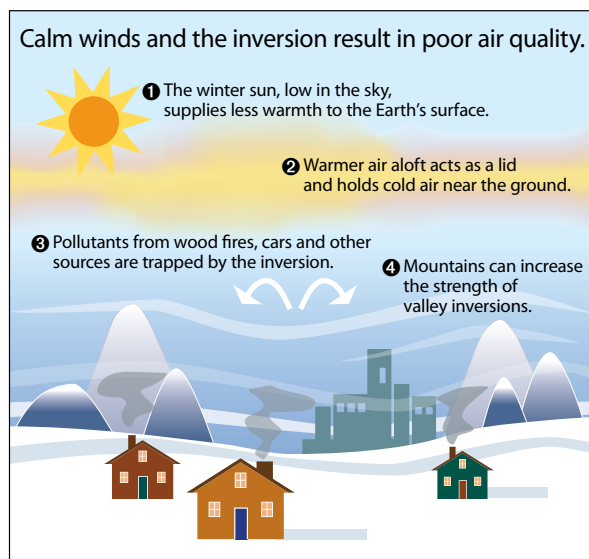
There are two types of temperature inversions: surface inversions that occur near the Earth's surface, and aloft inversions that occur above the ground. Surface inversions are the most important in the study of air quality.

How do surface temperature inversions form?

The most common manner in which surface inversions form is through the cooling of the air near the ground at night. Once the sun goes down, the ground loses heat very quickly, and this cools the air that is in contact with the ground. However, since air is a very poor conductor of heat, the air just above the surface remains warm.

Conditions that favor the development of a strong surface inversion are calm winds, clear skies, and long nights. Calm winds prevent warmer air above the surface from mixing down to the ground, and clear skies increase the rate of cooling at the Earth's surface. Long nights allow for the cooling of the ground to continue over a longer period of time, resulting in a greater temperature decrease at the surface.

Since the nights in the wintertime are much longer than nights during the summertime, surface inversions are stronger and more common during the winter months.



A strong inversion implies a substantial temperature difference exists between the cool surface air and the warmer air aloft.

During the daylight hours, surface inversions normally weaken and disappear as the sun warms the Earth's surface. However, under certain meteorological conditions, such as strong high pressure over the area, these inversions can persist as long as several days.

In addition, Spokane's topographical features can enhance the formation of inversions, especially in valley locations.

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Inversion...

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How do inversions impact air quality?

Surface temperature inversions play a major role in air quality, especially during the winter when these inversions are the strongest. The warm air above cooler air acts like a lid, suppressing vertical mixing and trapping the cooler air at the surface.

As pollutants from vehicles, wood burning devices including stoves and fireplaces, and industrial sources are emitted into the air, the inversion traps these pollutants near the ground, leading to poor air quality. The strength and duration of the inversion will control Air Quality Index (AQI) levels near the ground. A strong inversion will confine pollutants to a shallow vertical layer, leading to high AQI levels, while a weak inversion will lead to lower AQI levels.

CXT Inc. is the Recipient of the 2011 Clean Air Award

CX^T, Inc. is the 2011 recipient of the Clean Air Award, presented by Spokane Clean Air to a business that consistently demonstrates a significant commitment to reduce air emissions.

CXT, Inc. is a leading supplier of precast concrete and railroad products in the U.S. The company operates two facilities in Spokane Valley; one produces concrete railroad ties and the other manufactures pre-fabricated concrete outdoor buildings.

About a year ago, CXT decided to “go green” and in doing so, implemented several facility-wide changes. A big change occurred in the painting department of the concrete outdoor building facility. Most of the solvent-based paints have been replaced with water-based, which contain very low Volatile Organic Compounds (VOC) content. The company also switched out their solvent-based parts cleaner with a cleaning fluid that is much more environmentally-friendly. These changes have dramatically reduced their hazardous waste generation and associated disposal costs. In addition, their VOC

emissions have been cut in half! VOC emissions contribute to the formation of ground-level ozone, a pollution concern in Spokane during the summer months when ozone levels are at their highest.

What is especially remarkable is that CXT made these changes during a period of significant growth. In 2010, while these changes were being implemented, production at the facility was up 20 percent.

In addition to the changes in the painting department, CXT has modified their concrete mix at both of their facilities reducing the use of heaters for curing the concrete. By using less natural gas, the combustion emissions generated by the heaters have been reduced by 20%.

Taking the “go green” a step further, CXT joined the Commute Trip Reduction program in which they encourage employees to use commute alternatives to get to work.

Spokane Clean Air is proud to publicly recognize CXT Inc., as the 2011 Clean Air Award recipient!



Wood Burning Restrictions/Burn Bans

On January 3, Spokane Clean Air Agency issued a Stage II/Condition “Red” burn ban. The ban restricted the use of all solid fuel (mainly wood & pellet) burning devices within the Spokane Smoke Control Zone. It also restricted all outdoor burning in Spokane County.

The burn ban was issued because stagnant air was contributing to the build-up of fine particle pollution primarily from wood burning devices. By Wednesday, January 5, the weather system changed and air quality improved, prompting the lifting of the burn ban.

If you use a wood stove, fireplace or fireplace insert, it is important that you check burning conditions prior to using your device. There are three ways to access this information:

- ❶ Call the 24-hour Burn Information Hotline: 477-4710.
- ❷ Visit www.spokanecleanair.org and click on the “Burning Conditions” icon at the top of the webpage.
- ❸ Sign up for a free email listserv and we’ll send you an email whenever a burn ban is issued. Sign up at www.spokanecleanair.org.

Air Operating Permits

Spokane Clean Air registers and inspects over 640 commercial and industrial facilities that emit pollutants to the air. In addition, there are nine facilities, listed in the shaded box on the right, that fall under the federal Air Operating Permit (AOP) program, which is administered locally by Spokane Clean Air.

The purpose of the AOP program is to ensure that pollution controls for industries are upgraded as control technology advances.

Under the AOP program, Spokane Clean Air issues five-year renewable operating permits. Permits apply to large industrial facilities, as well as to industries that pollute less but may still cause potential public health or environmental problems.

AOP sources are required to annually certify to Spokane Clean Air that they are in compliance with all requirements and they must self-report any deviations. Each facility must pay fees adequate to fully fund the AOP program. An independent audit of the AOP program is conducted annually.

There are many benefits to the air operating permit program, including the streamlining of all the various permits into a single permit for the facility. The AOP program also provides for a greater opportunity for public participation during the permitting process.

Other benefits include enhanced air quality planning, clearer determination of applicable requirements; improved enforceability of the applicable requirements and better emissions inventories.

Who Needs a AOP?

Generally, these sources include:

Major Sources of Criteria Pollutants. These are sources (facilities) that emit or have the potential to emit more than 100 tons per year of a criteria pollutant (there are six criteria pollutants: carbon monoxide, particulate matter, ozone, nitrogen oxides, sulfur dioxide, and lead.) A source may opt out of the permit program by accepting a federally-enforceable limitation to keep its emissions below 100 tons per year.

Major Sources of Hazardous Air Pollutants. Any source with a potential to emit more than 10 tons per year of a single hazardous air pollutant; 25 tons per year of any combination of hazardous air pollutants; or any smaller amount specified by EPA.

Approved and active Air Operating Permits issued by Spokane Clean Air are available on line at www.spokanecleanair.org/air_operating_permits.asp

Non-Major Sources Specifically Identified by EPA.

Some non-major sources that are subject to certain federal regulatory programs are also subject to the operating permit program, as mandated by EPA.

Nine Area Facilities with Air Operating Permits

CDC Mead, LLC - Aluminum Smelter. CDC Mead is maintaining the former Kaiser Aluminum Smelter permit for possible future use. Current permit expires July 5, 2014.

City of Spokane - Northside Landfill - Municipal Solid Waste Landfill. Current permit expires June 9, 2015.

Fiber-Tech Industries Inc. - Fiberglass Reinforced Plywood Manufacturing Operation. Current permit expires February 21, 2013.

TransCanada Gas Transmission Northwest Corporation (GTN) - Compressor Station on Natural Gas Pipeline. Current permit expires April 13, 2013.

Inland Empire Paper Company - Newsprint Paper Mill. Current permit expires September 30, 2012.

Kaiser Aluminum Fabricated Products, LLC - Aluminum Sheet and Plate Rolling Mill, Trentwood Works. Current permit expires May 18, 2013.

Melcher Manufacturing Company, Inc. - Manufacturer of Fiberglass Loading Ramps. Current permit expires May 10, 2014.

Mutual Materials Company - Manufacture of Bricks, Mica Brick Plant. Current permit expires February 12, 2014.

City of Spokane - Spokane Regional Solid Waste System - Municipal Solid Waste Combustion, Waste-to-Energy Plant. Current permit expires October 29, 2011.

Approved and active Air Operating Permits issued by Spokane Clean Air are available on line at www.spokanecleanair.org/air_operating_permits.asp

◆ AIR QUALITY CALENDAR ◆

Happy New Year!

The Spokane Clean Air Board of Directors conducts its regular business on the first Thursday of each month, beginning at 9:30 a.m., at the Spokane Clean Air office, 3104 E. Augusta Ave. If a change to this schedule occurs, it will be publicized. Check our website, www.spokanecleanair.org, for current meeting information, including agendas and minutes.

Saturday, Feb. 12 I Love Clean Air at Mobius Kids, 10 a.m. - 2 p.m. Call 477-4747, extension 114 for more details.

McKay Named 2010 Air Monitoring Operator of the Year for Washington

The recipient of the 2010 "Air Monitoring Operator of the Year" award for Washington state is Mike McKay, Air Quality Technician for Spokane Clean Air.

The award, presented by the Washington Department of Ecology (Ecology), is presented to one recipient each year who "stood above the rest" by taking on extra tasks in addition to their usual duties.

McKay is getting the award based on his consistent high quality work. Stan Rauh, Quality Assurance Coordinator for Ecology, stated that "Mike is one of the few operators I don't have to remind to get his reports in on time."

McKay's responsibilities with Spokane Clean Air are varied. His main responsibility is the PM₁₀ monitor-

ing network and is back-up for the PM_{2.5} network.

McKay also serves as the manager of the Agency's Vehicle Fleet, and is the resident go-to, all-around handy man!



"Mike is always available to take on new projects and provide ideas to improve operations," said his supervisor, Ron Edgar, Chief of Technical Services for Spokane Clean Air.

McKay began working for Spokane Clean Air in 1999 as an intern and soon became a permanent, part-time Air Quality Technician. In 2005 he was moved to full time status.

McKay earned a BA in Business Management and Social Anthropology from Evergreen State College. He has also attended SCC, SFCC and Eastern Washington University.

On the Air is a publication of the Spokane Regional Clean Air Agency. Its purpose is to inform local residents on all aspects of outdoor air pollution. Please contact Lisa Woodard, *Editor*, with comments or story ideas:

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