

SMOG INHALATION

Part two of a four-part series on health and the environment

by Zoe Cormier

"Asthma is such a common thing in this city, it's pathetic. We live in a cloud, but what are we going to do about it?" Len Sowinski, 42, an iron worker with the Local 700 swigs from a cold bottle of beer, cooling off from an August evening at Fat Moe's, a Sarnia watering hole. Sharing a drink on the patio, this is where many workers come to speak about the uglier aspects of life under the smokestacks. A cover band breaks out Joni Mitchell's "Big Yellow Taxi," a few people joining in: "They paved paradise, put up a parkin' lot..." The song is apt—Lambton County is home to Canada's largest concentration of petrochemical factories. Industry is the lifeblood of the city's economy, but also responsible for the smog and foul smells that fill the air.

"I'm probably going to die of lung cancer too, like a lot of workers here, but I've got kids—where else can I make 30 bucks an hour?" asks Sowinski.

"Asthma runs rampant here, and everybody gets lung cancer," says a 32-year-old Suncor employee who withholds his name. He takes a haul off his inhaler (which he has been using since he was seven). "That's why they pay us so much to work in the factories—not because of our expertise, but because we're going to die young," he says.

Speaking for the factories, Scott Munro, executive director for the Sarnia Lambton Environmental Association (an industry group representing 19 local facilities), points out that the levels of most airborne pollutants have decreased considerably since the 1970s, adding that "there is no evidence that people here are exposed to levels [of airborne pollutants] that are higher than the levels set by the provincial government considered to be safe."

But the average person in Sarnia isn't so confident that the air they breathe is safe—after all, Sarnia is home to three of the top ten emitters of respiratory toxicants in Ontario:



PHOTO: Suzanne Tucker

How safe is the air we breathe?

Asthma and smog alerts are on the rise in all urban centres across Canada. Industrial and vehicle emissions are two of the biggest problems but there are effective economical ways of cleaning up the air.

the Lambton Generating Station, a coal fired plant (number 3), Imperial Oil's Sarnia Refinery Plant (5), and Shell Canada Product's Sarnia Manufacturing Centre (10).

A telephone survey of 383 residents in February and March 2000 by the County of Lambton Community Health Services Department found that two thirds of respondents were concerned about the effects of air pollution on their health, almost half believed they or somebody they lived with had experienced a 'negative health effect' from the air.

"Honestly, if you go to Barrie for the weekend and come back to Sarnia, you can feel the difference instantly," says Sowinski.

Smog is made up of a slew of gases, vapors, and particles that can damage the lungs: nitrous oxides (which give smog its brown colour); sulphur oxides (often foul smelling); carbon monoxide (fatal in high doses); a number of hydrocarbon gases

(also called volatile organic compounds, or VOCs); and microscopic bits of dust, ash, and metals (collectively called 'particulate matter'). Since the introduction of the Clean Air Act in 1969, levels of most of these pollutants in Canada's air have considerably declined; between 1974 and 1992 the average Canada-wide concentration of some of these major pollutants in the air fell between 38 per cent and 61 per cent

But the downside is that local concentrations of pollutants in Canada's urban areas are higher than they were in the 1970s due to more cars—this, coupled with hotter summers, are subjecting us to more smog alert days every year.

And industrial emissions, although lower than in the 1970s, haven't improved much in recent years. Air pollution decreased by a mere two per cent between 1995 and 2003, according to a 2005 analysis carried out by Pollution Watch, a collaborative effort of the

Environmental Defence Canada and the Canadian Environmental Law Association, using data from the federal government's National Pollutant Release Inventory (NPRI) to which all major industrial facilities in Canada report the amount of chemicals they release to the air, water, and land.

The average person breathes about 15,000 litres of air per day—so even with low concentrations of pollutants this raises concerns.

For people already suffering from respiratory problems (such as asthma, emphysema and bronchitis) smog makes symptoms worse—and can even be deadly. According to a February 2005 study released by the European Commission, approximately 310,000 people in the EU die prematurely every year from air pollution. Worldwide, the World Health Organization estimates the number at three million—three times more than the number of people who die in automobile collisions.

It is well established that air pollution can make people who are already sick worse. But now many authorities are concerned that air pollution could actually cause respiratory illness in healthy people. A number of recent scientific studies have illuminated the mechanisms by which air pollutants can cause physical damage.

For example, a February 2005 study in *Environmental Health Perspectives* found that long-term exposure to fine particulate matter (which enters the blood through the lungs) inflames, hardens, and eventually thickens the arteries by somewhere between three and six per cent. Constricted blood vessels strain the entire body, especially the heart, and can contribute to an early death.

But even short-term exposure to air pollution can leave physical marks. A January 1992 study in the *American Journal of Pathology* found that 79 per cent of people who lived in Mexico City for more than 60 days developed abnormal tissue growth in their nasal cavities due to exposure to ozone.

Some scientists are also now concerned that air pollution could contribute to lung cancer—formaldehyde and benzene are both known carcinogens; fine particulate matter often contains carcinogenic (or possibly carcinogenic) metals, such as nickel, cadmium, arsenic, beryllium, mercury, and lead.

There is also good evidence that air pollution may be responsible for the epidemic of asthma in Canada. It's been known for a long time that smog makes asthmatic attacks worse, but now science has shown that "being in a smoggy environment actually gives rise to more cases of asthma—it's

one thing to make attacks even worse, it's quite another to actually induce more cases of asthma," says Ted Boadway, MD, executive director of health policy for the Ontario Medical Association (OMA).

Incidence of asthma is rising: In 1979, 2.3 per cent of Canadians were asthmatic. By 1994, this number reached 6.1 per cent, and by 1999 it rose to 8.5 per cent, according to a 1998 report from Health Canada.

And the damage may begin even before we take our first breath of air; a January 2005 study in *Pediatrics* that looked at air quality measurements and birth records in California in 2000 found that pregnant women who breathe highly polluted air give birth to smaller babies (about an ounce less than babies from cleaner neighbourhoods). Low birth weight is associated with an increased tendency to a whole host of health problems later in life.

There's a real economic cost to air pollution as well. The Ontario Ministry of Environment estimates that Ontario alone suffers a loss of \$9.8 billion a year due to the combined direct and indirect economic, health and environmental costs of air pollution (such as from missed work days, medical costs, damage to crops and forests, etc).

Air pollution, however, can be curbed, and some companies have already shown that progress is possible.

Pollution Watch ranked Carpenter Canada Co.'s Woodbridge Ontario facility second, and Les Aciers Canam's St-Gedeon Quebec plant fourth in Canada for reducing their emissions of respiratory toxicants between 1998 and 2002. These two facilities managed to reduce emissions without seeing a reduction in productivity (unlike the first, third and fifth biggest reducers in Canada, which all downsized or went bankrupt).

Between 1998 and 2002, polystyrene foam manufacturer Carpenter Canada managed to reduce annual emissions of respiratory toxicants by 369,546 kg, primarily by replacing methylene chloride with liquid carbon dioxide as a blowing agent during the foaming process.

Les Aciers Canam (also known as Canam Steel), the largest manufacturer of steel joists in Canada, reduced their annual air emissions of respiratory toxicants by 317,100 kg simply by switching to a different type of paint. The old paint contained a solvent, called xylene, which is toxic and escapes to the air easily—the new paints contain mineral spirit solvents instead. "Switching paints involved little capital expense—the costs of the new paint is a bit higher, but this is

offset by the fact that we reduced emissions and we have a safer working environment for our employees, something we value," says Jean-Philippe Monfet, Environmental Director for Les Aciers Canam.

Of course, we can't expect industry to change much without legislation. Some provincial and federal governments have shown leadership with hard targets for the three main sources of smog: industry, energy, and transportation.

In Ontario, new regulations came into effect in 2005 that will reduce emissions from industrial facilities. Regulation 194/05 (effective May 2005) aims to reduce emissions of nitrous oxides by 21 per cent by 2015 (from 1990 levels) and sulphur oxides emissions by 46 per cent (from 1994 levels) for seven industrial sectors. Regulation 419/05 (effective since November 2005) set new standards for levels of air pollutants for the first time in 25 years. Standards for 40 substances have been laid out, 30 of which are lower than previous limits.

"Facilities will now have to inform the ministry if they are out of compliance with these standards. Moreover, the courts will now be able to charge companies that do not comply, with fines up to six million dollars," says John Steele, spokesman for the Ontario Ministry of the Environment.

Ontario is also taking steps to deal with pollution from energy production, which is the main source of particulate matter in the province. Coal-fired plants—which can be blamed for 668 deaths a year, according to the Ministry of Energy—will all be shut down by 2009. New clean burning natural gas power plants will make up the lost coal power (which at present provides about 17 per cent of Ontario's electricity), and two new hydroelectric projects and five wind farms (under construction) will help the province meet its goal of generating 10 per cent of Ontario's power from renewable sources by 2010 (although nuclear power will also be increased with repairs to old reactors and possible construction of new plants).

But for the 80 per cent of Canadians who live in urban areas the biggest problem is transportation. According to Toronto Public Health, transportation emits about 35 per cent of the city's sulphur oxides, about 65 per cent of nitrous oxides and more than 75 per cent of carbon monoxide.

For this reason the federal government is imposing new restrictions on fuel. As of January 1, 2005 the amount of sulphur in gasoline was limited to an average concentration of 30 parts per million (ppm), down

from the 2002 limit of 150 ppm. And as of September 1, 2006 the amount of sulphur contained in on-road diesel fuel will be limited to 15 ppm, down from 500 ppm. These limits are mandatory (regulated by Environment Canada), subject to fines of up to \$1 million (CDN).

Industrial emission caps, phasing out 'dirty' energy production, and new vehicle fuel standards are all well and good, but air pollution isn't going to go away with these steps alone. However, there are plenty more solutions available.

When it comes to green power, Canada lags behind. While less than one per cent of Canada's electricity is generated by wind, Denmark already produces 20 per cent of its power from wind farms. With so many blustery mountains, prairies, and arctic plains, it's hard to see why Canada doesn't already lead the world in wind power.

But even if more of our energy came from renewables, we still need energy conservation. Efficient appliances have been available for many years—fluorescent lightbulbs, hybrid solar/electric water heaters, geothermal heat pumps, just to name a few. We should build on the incentives already in place to encourage Canadians to save energy such as the EnerGuide for Houses Retrofit Incentive. The federal government offers homeowners grants of up to \$3,348 (average being about \$630) for the installation of efficient heating and insulation (which of course comes with the added bonus of lower energy bills). And drivers can reap PST tax rebates for buying a hybrid vehicle in BC, Ontario, and PEI (PEI

offering the sweetest deal, up to \$3,000 on paid PST).

Canada has also dragged its feet on efficient vehicles. Paul Martin's government drew criticism in April 2005 when they announced that fuel efficiency (i.e. miles per gallon) standards for new cars would be voluntary—not mandatory. Balking to pressure from industry, the Liberals scrapped vague proposals for mandatory standards and instead signed a Memorandum of Understanding (MOU) with auto manufacturers, who pledged to cut annual greenhouse gas emissions from Canada's fleet of vehicles by 5.3 megatons by 2010. But the MOU is not legally binding, and there are no penalties.

To be fair, voluntary agreements are not necessarily ineffective. The European Union is expected to meet their targets for fuel efficiency with voluntary standards. But the EU has specifications—new cars are to emit no more than 140 grams of carbon dioxide per kilometre by 2008, a 25 per cent reduction over 1995 levels. Our MOU does not stipulate exactly how vehicle reductions are to be achieved; if Canadians reduce emissions because they drive less, the MOU will have been met, whether manufacturers produce more efficient vehicles or not. Moreover, a mandatory approach is not unthinkable—in 2002, California became the first US state to pass mandatory vehicle efficiency standards with Bill AB 1493 (which has been challenged in federal courts by auto manufacturers, slated to go to trial in January 2007).

"But if your strategy is cleaner cars, you still have auto dependency, you still have air pol-

lution. Don't treat the symptom, treat the disease: bad urban planning," says Gord Perks of the Toronto Environmental Alliance. He points out that it is near impossible to live in Canadian suburbia without a car. But he says there are many ways to alleviate the problem. Convert the middle lanes of broad suburban streets into bus or streetcar lanes, like on Spadina Avenue in downtown Toronto. Change the zoning laws to force taller buildings (thus curbing suburban sprawl). Use Toronto's under utilized existing city-to-suburb rail tracks to provide quick and reliable routes for commuters. Create tax incentives or reduce the price for using public transportation (something Steven Harper has already hinted at), and hike fees for driving (like in London, England, where drivers are charged eight pounds every day they drive into the centre of the city—and 50 pounds if they fail to pay the fee by midnight).

Air pollution is probably the world's oldest environmental problem, and it is still a huge one. There are more smog days every year, asthma is on the rise, and the economic cost of air pollution runs into the tens of billions of dollars. But the solutions are there: tougher vehicle standards, a greater investment in green energy, more incentives to reduce energy use, bigger commitments to public transportation, and wiser urban planning. Even through all the smog, it's hard to see why we can't do better. **CK**

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Progress Reports

According to Inco spokesman Steve Mitchell, the nickel behemoth has spent close to a billion dollars since 1988 on reducing emissions at its Copper Cliff facility. Inco's new fluid bed roaster technology installed at a cost of \$150 million at the Copper Cliff operation will bring sulphur oxides emissions down another 34 per cent and metals 20 per cent by 2006. At Inco's Thompson facility, between 1997 and 2000, "we cut our metals emissions by about 50 per cent and we're hoping to reduce them by 80 per cent by 2008," he adds.

At the Shell location in Sarnia, "we have reduced our 2004 nitrogen oxides emissions by 62 per cent since 1990, and our 2004 sulphur oxides emissions by 21 per cent since 1994, and under new regulations we'll have to reduce nitrogen oxides by another 14 per cent and sulphur oxides by 42 per cent by 2010," says Gerry Ertel, regulatory affairs manager for Shell Canada, whose manufacturing centre in Sarnia ranked tenth in Ontario for overall production of air pollution.

Oil sands extractor Syncrude supplies 13 per cent of Canada's petroleum from production at a single facility, the Mildred Lake Plant Site (in Alberta). It also placed fifth in Canada for increasing releases of respiratory toxicants, according to Pollution Watch. This tune may change though—a quarter from every dollar spent by Syncrude on their current expansion is directed towards environmental performance, such as switching to cleaner fuels, according to Syncrude spokesman Alain Moore.

Ways to reduce emissions of VOCs

Company	Source of Emissions	Solution	Result
Steelcase Canada	Liquid paint	Switch from liquid to powder paint	9 tonne reduction in emissions
Hemlock Printers	Alcohol in dyes	Switch to alcohol-free dyes	Reduced emissions by 50%
Bowne of Canada	Alcohol in dyes	Switch to alcohol-free dyes	29.3 reduction in emissions, plus net savings of \$133,000