

Danger lurks underground

Recent pipeline explosions two of thousands each year

Few incidents probed, fines range from \$1,000 to \$3,000

Robert Cribb
Toronto Star

No warning came for the seven people killed in last week's explosion that apparently happened after a construction worker inadvertently hit a Toronto gas line.

But red flags have been raised for years around the dangers of buried utility pipes.

A Star investigation has found there are literally thousands of incidents a year along the labyrinth of underground pipelines- a network that carries volatile liquids and natural gas within Ontario's towns and cities.

More than 21,000 incidents have occurred between 1997 and 2001- anywhere from a minor tear in a pipe to a major gas eruption on a city street. Yet only a fraction are ever investigated.

Authorities investigated only 1,013 ruptures in the past six years, incidents which, like last week's explosion, were considered serious due to personal injuries or extensive damage to property or the environment, according to data obtained through a Freedom of Information request.

More troubling, however, is a staggering 92 per cent of those incidents were the result of human error, often due to careless excavation by construction firms, according to data from the Technical Standards and Safety Authority (TSSA) which regulates pipelines in Ontario.

Only eight of these cases triggered prosecutions, the result of a hands-off approach by the regulator.

"We believe very strongly that human nature responds as positively to incentives as it does to penalties," said Margaret Kelch, president and CEO of the TSSA. The explosion in Toronto last week represents the largest loss of life ever caused by a pipeline incident in Canada.

The TSSA is investigating and police say they have no plans to lay criminal charges. But acting chief coroner Jim Cairns says he plans to call an inquest into the deaths. "This was preventable. I don't consider this a freak accident," he said. "The fact that these lines end up rupturing on a frequent basis is highly significant."

Even as distraught families were mourning the deaths in Toronto's blast, a similar explosion hit Windsor on Monday, four days later. Workers cutting a section of a natural gas pipe in that city triggered a fiery blast that sent four men to hospital. One man died Wednesday- the eighth death within a week in Ontario related to a pipeline rupture- and another remains in critical condition suffering second- and third-degree burns.

The past 10 days will be remembered as the most tragic in recent memory when it comes to broken pipelines.

While experts agree that underground pipelines are safer than other potential modes of land transportation- such as rail or road- the risks associated with carrying dangerous liquids and gases through pressurized pipes demand tighter regulation, they say.

Sam Morra, executive director of the Ontario Sewer and Watermain Construction Association, says most people in the industry are diligent about mapping out the dangers before digging. Others take dangerous shortcuts.

"You cannot condone anyone that goes out there and digs without (first locating buried pipelines)," he says. "We feel the full extent of the law should be used against those parties."

By law, construction firms are supposed to contact utilities that have lines in the area where they intend to dig and get "locates"- detailed information on where the lines are beneath the ground. (Who in the

industry, and beyond, hasn't heard the universal slogan, "Call before you dig?")

Officials from the utilities- companies such as Enbridge and Union Gas- generally visit the dig site and mark their lines on the ground or pavement.

Sometimes, however, the "locates" can be inaccurate or insufficient, or it might take two or three weeks to get utilities to show up at a job site- too long to put construction crews on hold, Morra says.

"The (pipeline location) information provides you with an indication of where they believe the utilities are. They don't give you the degree of information that we feel is required to properly perform excavations and protect workers." That kind of information would include the age of the utility, its depth and its structure, he says.

Either way, when that step is skipped or when proper safety measures aren't taken, tragedies can happen.

In the case of last week's explosion, construction firm Warren Bitulithic did follow proper procedures in getting the location of pipelines marked on the pavement before digging, said David Guptill, a spokesperson for Lafarge Construction which owns Warren Bitulithic.

The company was halfway through a \$2.2 million contract for the city, replacing curbs and gutters along Bloor St. from Kipling Ave. to the East Mall area when the accident happened.

Guptill said the company is still investigating the details of how the digging was being done around the site. Company workers did strike a pipeline while digging with a backhoe, he said, but the pipe did not rupture. Moments later, the explosion occurred in the nearby plaza.

Workers are supposed to dig with shovels instead of heavy machinery for three feet on either side of a

marked pipeline in order to avoid any chance of a rupture, he said.

But Guptill added it still isn't clear whether the line was properly marked by the utility.

"It all goes back to whether there was a locate mark where the people were digging If there was, why on earth were they not hand-digging? That is an offence within the organization that warrants very serious disciplinary action."

In the case of an accident in a Hamilton neighbourhood two years ago, a construction firm was clearly held to blame for damaging an underground natural gas pipeline.

It happened one December afternoon shortly after some recall a strong sulphur-like smell, a sign of natural gas, wafting a few metres away from where workers were laying a new sewer pipe. Within minutes, perhaps seconds, an explosion from a punctured pipeline triggered a whoosh so powerful it literally raised the house off its foundation.

It landed askew, its side walls swollen outward, flames instantly reaching upward as they began consuming the home.

"I was putting the garbage out and when I turned around to walk back in the yard it blew," says Dennis Baker, who lives across the street. "I looked over and I saw the goddamn side of the house was bulged out."

He recalls walking toward the house to offer help to its occupants who, by a stroke of luck, weren't home at the time.

Of the 1,013 major ruptures since 1997- caused by a total of 763 different companies, mostly home builders and construction firms- Toronto with its ongoing building and higher density of pipelines has sustained the most.

The city has seen 219 incidents ranging from highly pressurized natural gas escaping into the air on downtown city streets to oil pipe ruptures spilling toxic ooze into the soil.

Since 1997, Mississauga has had 142 pipeline ruptures, Vaughan 95 and Brampton 39.

Perfect Post Hole, a Kitchener-based firm that digs holes mainly for residential fences, is listed in TSSA records in connection with six ruptures between 1998 and last year. In at least three cases the firm failed to first locate the pipelines.

Bill Dow, director of the company, said he's unaware of the incidents because his firm is a licensee for 30 independent operators across the province. He said it's the responsibility of each franchisee to locate pipes before digging.

Home builders are conspicuous on the list of repeat offenders when it comes to pipeline ruptures.

Eden Oak Homes has been involved in five ruptures since 1997, according to TSSA data. In at least three cases, workers failed to locate pipes. Company officials did not return calls from the Star this week.

The Law Development Group, a Toronto-based home builder, is listed with five ruptures- all in 1998-related to human or organizational error. Company president Larry Law said it has since taken steps to improve safety standards.

In the past six years, Mississauga-based Mattamy Homes, one of the province's largest home builders, has triggered eight ruptures- among the most of any company in Ontario- TSSA data shows.

In every case, records say company workers failed to locate lines in the areas where they were digging.

Mattamy has been prosecuted once by TSSA, when the company was fined \$3,000 last year.

Mark McHone, executive vice-president of operations for Mattamy Homes, says it is the company's policy to always get pipeline plans before digging.

"Occasionally, maybe we called and maybe it was lost and I can't put my finger on that," he says. "It's a concern that we're working on." Considering Mattamy is one of the biggest home builders in Ontario, eight incidents is low, McHone adds.

"Eight is a number we need to improve on ourselves, but out of 3,000 (homes) that we build on an annual basis ... that's a small number."

In addition to Mattamy's fine, the TSSA has prosecuted only seven other companies or individuals since 1997.

In one, the court lost the charges and the case was dismissed. One case is still before the courts. Of the remaining five, those found guilty of natural gas pipeline hits received fines.

The largest fine ever- \$45,000- was laid in March against Battaglia Contracting Ltd., the company

convicted in the Hamilton house explosion. The backhoe operator in that incident was fined \$500.

In 2000, an Ottawa-area fence company, Navan Fence, ruptured a pipeline after failing to contact the local gas utility to identify the location of the line and was fined \$20,000. Those two fines- awarded by the court- were uniquely high because of "major damage" done, and possibly other factors such as the company's past history, said Tom Zach, a spokesperson for the TSSA, a not-for-profit agency at arm's length from the provincial ministry of consumer and commercial relations.

The organization is empowered by provincial legislation to regulate fuel safety in Ontario and is financed by the industry in exchange for services such as inspections, issuing licences, audits and training programs.

Fines typically range from \$1,000 to \$3,000.

In most of the thousands of pipeline ruptures listed in TSSA records, investigators either took no action or handed operators "instructions" or "orders" to fix the problem.

The non-punitive philosophy, he said, is part of the agency's plan to work with the industry to prevent problems rather than issue sanctions.

The small percentage of pipeline hits that actually get investigated by the TSSA is largely the result of limited resources, said Zach. The agency has 34 fuel safety investigators covering a province that sees more than 4,000 incidents a year.

"It's impossible to investigate 21,000 incidents over five years," he says. "We try to focus our resources towards where there are repeat offenders and the greatest danger."

The environment ministry conducts an investigation where a pipeline rupture poses an environmental risk, but ministry spokesperson John Steele says it's difficult to prosecute for such incidents because they're often difficult to prove.

"Companies can always use, if they have the evidence, due diligence as a defence," he said. "Due diligence means, 'We did all we could do to stop an environmental offence from occurring, but it happened despite our best attempts of stopping it.' The Supreme Court recognizes that as a defence."

The environment ministry has logged 265 pipeline ruptures in Ontario since 1995. Of those, 210 were related to excavation.

Only nine of those cases were investigated by the ministry's investigative and enforcement branch, leading to a single charge- a 1998 case in which TransNorthern Pipelines was convicted and fined \$50,000 for a rupture that prompted a gasoline spill near Ottawa, contaminating soil and groundwater.

It will take some time for heavy equipment to clean up the debris left from last week's explosion in Toronto.

In the meantime, Warren Bitulithic will soon resume its construction job and complete it as scheduled. Warren Bitulithic has been awarded several hundred contracts with the city over the years, said Gord MacMillan, the city's director of district engineering services.

"They're a reputable company. This was an accident."

That offers little comfort to people like Jim Makris who lost his aunt, Dora Carambelas, 60, and his cousin Tina Kirkimtzis, 32, in the explosion. Considering the potential for human tragedy, Makris

said regulators have a responsibility to impose the strongest possible measures.

"There should be the most stringent rules when we're dealing with anything that's volatile," he said. "Extreme care should be taken and regulated very, very carefully."

Pipeline rupture data

The Star obtained a database of pipeline investigation records earlier this year after filing a formal request to the Technical Standards and Safety Authority. The data includes electronic records of each investigated incident from 1997 to 2002, detailing the date, location, name of company involved, and any orders or prosecutions.



CP PHOTO

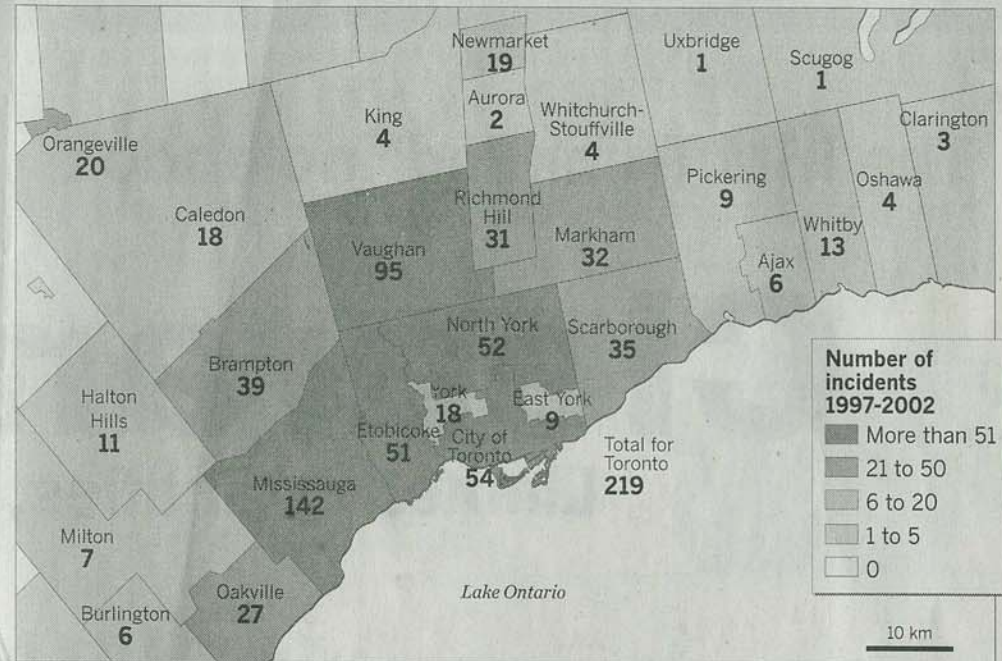
Four days after an explosion killed seven at a Toronto shopping plaza, workers cutting a section of a natural gas pipe in Windsor triggered a fiery blast Monday that left one person dead.

Danger Below

'I don't consider this a freak accident. The fact that these lines end up rupturing on a frequent basis is highly significant.'
 Acting chief coroner Jim Cairns

Pipeline hits

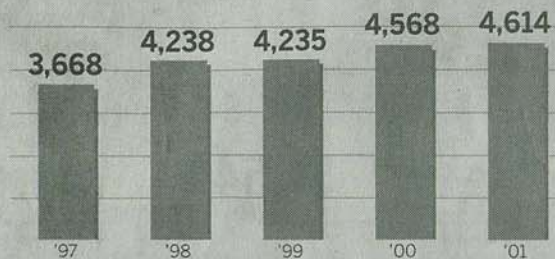
More than half of the 1,013 pipeline incidents investigated in Ontario between 1997 and 2002 occurred in the Greater Toronto Area. Here is a breakdown by municipality:



Incidents

In 2001, there were 4,614 natural gas pipeline incidents in Ontario — anything from an individual digging in the backyard to an excavation crew on city streets. Fewer than 5 per cent were investigated.

Pipeline hits reported by distributors



Down the pipe

- Proportion of Canadian-produced crude oil and natural gas transported by pipeline: **95%**
- Value of natural gas, oil and oil-related products delivered via pipeline in 2001: **\$65 billion**
- Proportion of Canada's crude oil imports transported through pipelines: **33%**
- Velocity at which natural gas travels through pipelines: **20 kilometres per hour**

Why it happens:

- 92%** Human error/failure to locate pipelines
- 3%** Mechanical failure
- 1%** Corrosion/material deterioration
- 1%** Natural forces
- 3%** Other causes

GAS

GAS

GAS

GAS

GAS

GAS