

Tainted taps

'Forever chemicals' in drinking water leave communities in toxic limbo

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PHOTO ILLUSTRATION BY THE GLOBE AND MAIL/GETTY IMAGES



On a drizzly November afternoon last year, Judy Moss burst from her house in Torbay, N.L., sprinted to her red barn and dumped the water she'd drawn for her miniature ponies. Then she hurried up Kelly's Lane and started knocking on doors.

"Don't drink the water," she warned her neighbours.

Just minutes earlier, the 65-year-old court reporter had stood in her home office, stunned, as a Transport Canada official delivered the news over the phone: her well water was contaminated with per- and polyfluoroalkyl substances, toxic "forever chemicals" linked to cancer, developmental delays and immune disorders.

Ms. Moss's home of 34 years sits half a kilometre from St. John's International Airport, where decades of routine fire drills had caused PFAS-laced firefighting foams to seep into the soil. She has no way of knowing how long she and her neighbours were drinking the contaminated water or what it may have done to their bodies. They live in a kind of toxic limbo, unsure how deep the damage runs and uncertain whether anyone will fix it.

"Everything I got I put into this property," said Ms. Moss, who is single and runs a small court-reporting business out of her home. "And then to be told, 'Jesus, my dear you might never be able to sell that.' That's a big blow. That's a huge blow. That was something that I was not expecting at my age to be dealing with."

Her test results told a chilling story. Every litre of her tap water contained 140.9 nanograms of PFAS — more than four times the recommended safety limit Health Canada established last year. Transport Canada offered to supply her with free bottled water, as it had to others in town testing above the new threshold of 30 nanograms a litre (ng/L).

The department has provided few answers for residents demanding to know how long they'd been exposed to the chemicals and when it would be cleaned up. Across the country, other communities are on edge as they ask these same questions. PEI has tested more than a hundred drinking water sites across the Island and advised residents in at least two towns against drinking from their taps. The B.C. government has filed a national class-action lawsuit against PFAS manufacturers to recover the onerous costs of removing PFAS from tap water across the country.

Ottawa started testing government properties for PFAS around 2008. Since then, it has found 87 federal sites where the compounds have contaminated groundwater and posted the locations on a public database maintained by the Treasury Board. What the database doesn't reveal is how many sites have leached PFAS into nearby drinking water. To answer that, The Globe and Mail contacted government departments overseeing the 87 sites, reviewed hundreds of pages of court documents and interviewed residents in five provinces.

The reporting found that households in 11 communities now depend on bottled water supplied by Ottawa because their taps have been contaminated by PFAS in firefighting foams. Residents in at least three of those areas have filed lawsuits seeking compensation for any loss in property value and health risks. Court records show that some residents unknowingly drank contaminated water for years while Ottawa sat on test results. Now, they're demanding to know how long they were exposed and when their tap water will be safe to drink again.

"There's a lack of accountability here, a lack of transparency with respect to what they know about the contaminated site," said St. John's lawyer Alex Templeton, who is leading a proposed class-action lawsuit for impacted residents in Torbay and the neighbouring town of Logy Bay-Middle Cove-Outer Cove. Ultimately, he said, "people need to know about the status of the water that they are using as a potable water source."

'GUYS USED TO WASH THEIR HANDS WITH IT'

The Torbay experience mirrors stories from other parts of the world.

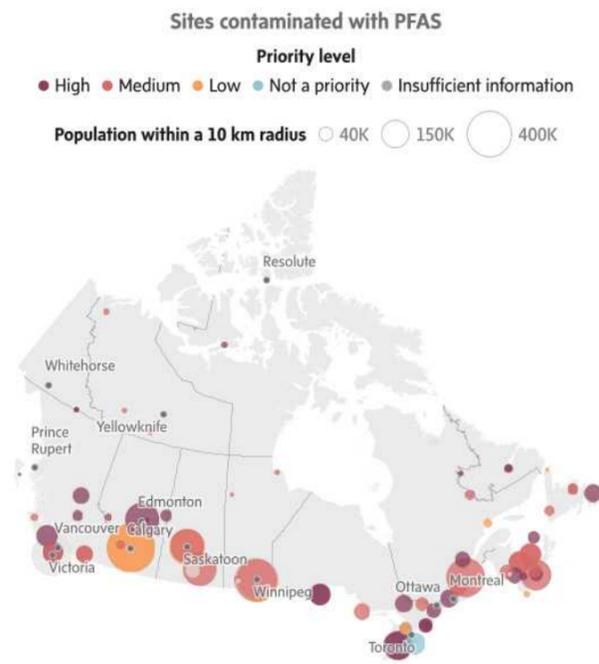
In Australia, the government has paid upwards of \$300-million to settle lawsuits from towns affected by PFAS contamination from firefighting foams. In the U.S., individuals and water utilities have filed more than 17,000 lawsuits against foam manufacturers seeking compensation for lost property value, health issues and the expense of filtering contaminated water.

Many of those cases have traced the problem all the way back to a DuPont laboratory in New Jersey where, 85 years ago, chemist Roy Plunkett was working on a new refrigerant using fluorine, an element sometimes referred to as Lucifer's gas for its dangerous reactivity. His experiments created a mysterious by-product, a slick waxy substance that resisted heat, acid and electricity.

Through a lab mishap, he'd stumbled on the first-known PFAS, polytetrafluoroethylene (PTFE). Rebranded as Teflon, it became the miracle coating that would bring US\$1-billion a year into DuPont's coffers.



Judy Moss, seen with one of her American Miniature horses in Torbay, N.L., last month, says it's a 'huge blow' to be told her property is contaminated and may not be able to be sold after putting everything into her home. GREG LOCKE/GLOBE AND MAIL



THE GLOBE AND MAIL, SOURCE: FEDERAL CONTAMINATED SITES INVENTORY

Teflon and its thousands of chemical cousins would find their way into non-stick pans, stain-proof couches, waterproof clothing and countless other products. Their durability came from one of the strongest bonds in organic chemistry: carbon-fluorine. That same bond made them nearly impossible to break down in the environment.

Today, PFAS have permeated every corner of the globe, turning up in turtle eggs, polar bear livers, Antarctic snow, the depths of the Arctic Ocean, human blood and breast milk.

The global spread first drew attention in the 1970s, when researchers detected the compounds in blood samples from across the U.S. and contacted 3M, a major PFAS manufacturer, to see if they might be responsible. The company pleaded ignorance, according to a memo released decades later during a lawsuit pitting Minnesota against 3M over PFAS contamination of its drinking water.

At the time, 3M was ramping up production of PFAS-based firefighting foams. Demand soared during the Vietnam War when a fire aboard the USS Forrester killed 134 sailors, prompting calls for better ways to fight aviation fuel fires. The Navy worked with 3M on a PFAS foam that would blanket liquid fuel, trapping combustible vapours from escaping and igniting.

The new foams were cleaner and more effective than the foul-smelling protein-based ones they replaced. "We just thought it had some sort of soap base," said retired Transport Canada firefighter Barry Spear. "Guys used to wash their hands with it. I was up to my eyes in the stuff."

Customers were told it was biodegradable and harmless to animals or aquatic life. But internally, manufacturers were reaching far different conclusions. By the late 1970s, 3M found PFOS — a PFAS common in foams — harmed rat livers and could be

fatal. Another study on rhesus monkeys had to be abandoned when all the monkeys died.

By 1994, Canadian regulators took notice. On Nov. 19, 1994, The Canada Gazette, the official record of government business, reported that a now-defunct federal tribunal, the Hazardous Materials Information Review Commission, ordered 3M to update its safety literature to acknowledge that certain foam ingredients could "cause adverse effects on the CNS, blood, bone marrow, gastrointestinal tract, liver and kidneys." 3M appealed before announcing in 2000 that it would phase out PFOS and another foam ingredient, PFOA.

Ottawa wouldn't crack down on PFOS until 2006, declaring it "toxic" under the Canadian Environmental Protection Act. PFOA was added shortly after. Both are known long-chain PFAS, meaning their molecules contain six or more carbon atoms and tend to accumulate in living tissues. The phase-outs had an impact. The Canadian Health Measures Survey found that between 2007-2009 and 2018-2019, PFOA levels in randomly sampled Canadian blood dropped by 52 per cent, while PFOS fell by 67 per cent.

DANGEROUS THRESHOLD STILL UNKNOWN

As Canada phased out the two most pernicious forever chemicals, federal government agencies began scrutinizing their own properties to see where the chemicals might be lurking. Transport Canada first tested the groundwater at St. John's International Airport in 2008. Two years later, the Department of National Defence (DND) began testing drinking water at its bases. Relying on Health Canada's limits at the time, both departments reported no cause for concern.

The rosy assessments wouldn't last. With new research linking PFAS to a wider range of adverse health effects, regulatory bodies around the world began reassessing what level of PFAS exposure should be considered safe. Health Canada maintained maximum levels for individual PFAS — 200 ng/L for PFOA and 600 ng/L for PFOS — before announcing in 2021 that it would start setting limits on PFAS as an entire class.

Last summer it established new guidance: the total sum of 25 different PFAS in drinking water should not exceed 30 ng/L. But the measure is a benchmark, not a legally binding standard, so it's non-enforceable. And considering that there are now 15,000 variations of PFAS, scrutinizing just 25 seems insufficient, say some critics.

"We're moving forward, but we're not moving forward fast enough to keep up with industries producing all these different compounds," said Miriam Diamond, who studies PFAS as a professor in the University of Toronto's Department of Earth Sciences.

But there is little international agreement on what levels of PFAS can be considered safe. Hundreds of studies, many based on large populations exposed to high concentrations, have firmly linked the chemicals to health harms. What remains uncertain is the threshold — the point at which exposure becomes dangerous.

The EU limits total PFAS in drinking water to 500 ng/L and levels for 20 individual PFAS to 100 ng/L. In the U.S., new Environmental Protection Agency limits are much lower, capping two common PFAS at four ng/L in drinking water.

The varying approaches reflect the difficulty of tracing links between long-term PFAS exposure and specific ailments.

“The health implications can show up 10, 20, 30 years down the line, so it’s very difficult to make a concrete connection,” said Scott Hopkins, chemistry professor at the University of Waterloo.

The lowered thresholds mean federal properties in Canada that passed early PFAS screenings no longer appear safe.

The 87 federal sites contaminated with PFAS span every province and territory, from urban centres (airports in Calgary and Winnipeg) to remote outposts (CFB Alert, the northernmost continuously inhabited place in the world). Moose Jaw’s 15 Wing air force base appears on the list five separate times for different contamination points.

While the federal contaminated sites inventory provides the precise co-ordinates for each site, it doesn’t show where drinking water has been affected. The Globe has confirmed with three government departments that Ottawa is providing bottled water in 11 locations to replace PFAS-tainted tap water. But each department has taken a different approach to disclosing that information.

The Department of Defence provided locations and total number of households being served: Mountain View, Ont. (4) and North Bay, Ont. (23). The National Research Council confirmed that it has facilitated water deliveries in Mississippi Mills, where it ran a lab studying fire. Transport Canada, meanwhile, declined a Globe request to release a full list of the eight locations where it’s delivering water, but court records show that the department is providing bottled water in Torbay, Yarmouth, N.S. and Abbotsford, B.C.



Nancy Coombs sits on her deck with her favourite chicken and delivered water bottles in Torbay, N.L., last month. Ms. Coombs says it feels like the government is trying to hide PFAS contamination levels. GREG LOCKE/THE GLOBE AND MAIL

‘HOW LONG HAS THE CONTAMINATION BEEN THERE?’

Today, questions of when tests were conducted and what they found are central to concerns in Torbay and other affected communities.

On Christmas Eve of 2015, a few dozen residents of Mississippi Mills, about an hour west of Ottawa, received a hand-delivered letter stating their wells could be contaminated with PFAS. The source was a nearby fire-research lab, operated by the National Research Council, where soil had been soaking up firefighting foams for decades.

What the letter didn’t say was that the agency knew PFAS had permeated local groundwater two years before telling residents. Residents would only learn that information years into a class-action lawsuit filed in 2016 seeking \$40-million for clean-up and lost property values.

“There was a covert effort here to keep this from the neighbours,” said Michael Hebert, lawyer for the residents.

Agency spokeswoman Pam Pilon said the NRC would not comment on matters before the court, but added that the agency has been testing water in the area since 2016 while providing filtration systems and bottled water.

In North Bay, Ont., the first warning for some locals came in the form of a road sign: “Do Not Eat Fish From Lee’s Creek,” it stated. “Elevated contaminants may pose a health risk.”

The signs went up after the Department of National Defence started testing along the creek in 2017 and discovered PFAS leaching from Jack Garland Airport, home to an air force base where firefighters practised with foams, down Lee’s Creek and into local well water.

DND’s tests showed PFAS levels as high as 400 ng/L. The department says it is now providing bottled water to 23 residences.

In La Baie, a borough of Saguenay, Que., Université de Montréal chemistry professor Sébastien Sauvé tested public tap-water sources in 2022 as part of a research project and discovered PFAS levels of up to 197 ng/L, later sourced to the nearby Bagotville air force base. He reported the results to the province, but residents were not informed until the following year, after the city and province carried out their own tests.

In Torbay, the windswept bedroom community of 8,000 located a short drive north of St. John’s, the contamination crisis that emerged in early 2024 continues to cause concern. Residents describe a haphazard testing regime where some homes were selected for sampling while others had to request it.

Edward Sheerr, who owns an executive-style



Eddie and Susan Sheerr prepare dinner with their children in Torbay in February. Testing showed the water their young daughters were consuming contained three times more PFAS than Health Canada’s recommendation. GREG LOCKE/THE GLOBE AND MAIL

Below: An EPA lab in Cincinnati tests samples for PFAS, which the United States limits in different amounts than other parts of the world. JOSHUA A. BICKEL/ASSOCIATED PRESS

Bottom: Mobile units for treating PFAS pollution in water were supplied by Veolia in Bartenheim and installed in eastern France in September. SEBASTIEN BOZON/AFP VIA GETTY IMAGES



home in the Pine Ridge subdivision, said he learned of the contamination through word of mouth, rather than from Transport Canada, and reached out to the federal agency.

Mr. Sheerr was alarmed when tests showed the water his young daughters had been drinking all their lives contained 93 ng/L – three times more PFAS than Health Canada’s recommendation. Since then, every three to four weeks, Transport Canada drops off 15 five-gallon jugs of water at the family home. The department says the deliveries are an interim measure while it evaluates long-term solutions, leaving the Sheerrs with many unanswered questions.

“How long has the contamination been there?” said Mr. Sheerr, who, along with his wife Susan, are now lead plaintiffs in the proposed class-action lawsuit. “Does it fluctuate? What are the health implications going to be of this?”

Transport Canada spokesman Flavio Nienow said the department is following an “evidence-based, step-by-step approach to assess and identify affected properties.” He said the delivery of bottled water is an interim measure while the department evaluates long-term solutions. In January, the department hired an environmental consultant to analyze current and historic sampling data, and develop a remedial and risk management plan.

However, that response falls short of what Torbay residents and their lawyer Mr. Templeton have been calling for – a hydrogeological study to determine the extent and delineate the plume of contamination.

In some respects, Canada has an enviable record on PFAS. The country has never manufactured the compounds, avoiding some of the major contamination scandals that have sickened people in Europe and the U.S., yielding settlements totalling more than \$12.5-billion from chemical companies.

In 2013, Italian authorities discovered PFAS contamination in the drinking water serving roughly 150,000 people in the country’s Veneto region. Subsequent research showed a strong link between the chemicals and elevated rates of heart disease, kidney cancer and testicular cancer. This year, an Italian court sentenced 11 former executives linked to the polluting factory to a total of 141 years in prison and ordered more than €60-million in damages.

The earliest and most famous example comes from Parkersburg, W.Va., where, starting in the 1990s, a cattle farmer noticed his animals dying of mysterious ailments. He suspected that a nearby DuPont landfill had contaminated the creek his

animals drank from and hired Rob Bilott, an environmental lawyer who normally worked for corporate clients. Their lawsuit confirmed his suspicions and revealed that DuPont had known for decades about health risks posed by PFOA, a member of the PFAS family, leading to significant settlement for victims and a global movement to address PFAS contamination.

Mark Ruffalo played Mr. Bilott in the movie version of the story, *Dark Waters*, released in 2019.

Parkersburg was dramatic, but the underlying problem is the same one facing Torbay. Once PFAS enters the environment, it persists, often travelling for tens of kilometres through creeks and soils and fractures in rock, while retaining its toxicity.

Tracking the problem takes extensive testing that residents say is lacking in Torbay. Nancy Coombs learned about the contamination only when a neighbour told her. She demanded a test, which showed PFAS levels of 105 ng/L – triple Health Canada’s guideline.

“It seems like they’re trying to hide it,” Ms. Coombs, 49, said. “Why didn’t they test the whole neighbourhood?”

She says she can’t help but worry about possible health effects. She had cancer removed from her leg last year, her husband has diabetes and their 13-year-old suffers from asthma.

“It’s just questions upon questions, just stressing us out,” she said. “The more I think about it, the more upset we get.”

Ottawa recently pledged \$26.8-million through the Canada Housing Infrastructure Fund to build a new water supply system in Torbay, but town chief administrative officer Sandy Hounsell pointed out that an additional \$9-million is still needed to start the project, and it would take up to five years to build. He said he’s been trying to secure the remaining 25 per cent required to build the water supply system, including meeting with the province and reaching out to the federal government, but so far neither has committed.

That’s only a fraction of the mounting costs of remediating of PFAS contamination nationwide. In soils, the chemicals can be excavated. In water, the process is more complicated. Several technologies can remove PFAS, including activated carbon (similar to a home Brita filter), reverse osmosis and ion exchange filters, where electrostatic attraction is used to pull PFAS molecules from water.

In La Baie, the federal government pledged \$15.5-million for temporary ion exchange units while the municipality looks for a new drinking water source.

In North Bay, Ont., the Department of National Defence has put up nearly \$20-million to remediate the airport plume. The final tab will be far greater. Lee’s Creek runs directly into Trout Lake, the municipality’s drinking water source. PFAS levels in the lake now reach 60 ng/L – surpassing Health Canada’s 30 ng/L objective but below a provincial limit of 70 ng/L.

The city is now considering upgrading its filtration system with activated carbon, ion exchange or lesser-known clay-based technology called Fluoro-Sorb.

Meanwhile, Ms. Moss, who had ran to warn her neighbours on Kelly’s Lane about contaminated tap water, is growing tired of lugging heavy water jugs and having them clutter her entranceway. Recently, she felt more hopeful to learn that she was one of three homeowners in Torbay chosen to pilot a water filtration system for Transport Canada – but she has yet to receive the system, which was supposed to come at the end of August.

And she still has many questions, such as what happens if the system doesn’t work, and if it does, will Transport Canada replace the filters and provide maintenance in perpetuity?

“I’m so fed up with it all,” she said.

Horses graze in Torbay Bight on the northside meadows in Torbay, N.L. Ms. Moss will be among three homeowners to pilot a water filtration system for Transport Canada, which has yet to arrive and be installed. GREG LOCKE/GLOBE AND MAIL

