

In Namibia, a Canadian copper company leaves a legacy of toxic waste

Sickness plagues the residents of Tsumeb, where tests have found soil to be contaminated with high levels of arsenic

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In the citrus orchards above the Namibian town, workers often fall sick. They say they feel a burning sensation in their eyes and throats and a metallic taste in their mouths as the wind blows across from the copper smelter a few kilometres away.

"When the gas is coming from that side, we get headaches and dizziness, and sometimes you feel like you want to throw up," says Festus Gawab, who has worked for three years on a citrus farm near Tsumeb, watering the orange and lemon trees.

His two children, aged 4 and 6, have visible sores on their bodies. His co-worker, Johnny Ngongo, has a range of similar symptoms. "It feels like fire in my lungs," Mr. Ngongo says.

Sickness has been common for years among the people of Tsumeb, an industrial town of about 35,000 people in the southern African country of Namibia, where Toronto-based Dundee Precious Metals Inc. ran the copper smelter – the town's biggest employer – for more than a decade, until August, 2024.

Many residents blame their health problems on the smelter's emissions and its vast stockpile of arsenic-laced waste. New laboratory tests, analyzed at a Swiss university as part of an investigation by The Globe and other media in Europe and Namibia, have found alarming levels of arsenic in samples from the town's soil and plants – and in its inhabitants.

In August, DPM completed the sale of its Tsumeb smelter to a Chinese company, Sinomine Resource Group, for US\$20-million. But it leaves behind a legacy of toxic waste, including a growing accumulation of arsenic trioxide whose exact size is undisclosed.

In its 2023 annual report, DPM reported net earnings of about US\$180-million from its operations in Namibia, Serbia, Bulgaria and Ecuador. On its website, it touts itself as "an environmentally and socially responsible gold mining company." It denies



People in Tsumeb, Namibia, blame the copper smelting factory for health problems in the town of about 35,000, which they say are caused by the plant's emissions and its vast stockpile of arsenic-laced waste. SAMUEL SCHLAEFLI/THE GLOBE AND MAIL

the allegations in Tsumeb, saying it invested hundreds of millions of dollars to upgrade the smelter to national and international environmental standards after acquiring it as an "aging and out-of-date" facility in 2010. This included US\$85-million to reduce arsenic contamination during its operations, it says.

"We paid particular attention to the health of our workers and the community," DPM spokesperson Jennifer Cameron said. "We modernized safety equipment, introduced new safety protocols, improved workplace health and wellness programs and made investments in community health facilities."

She said the company co-operated with a study in 2011 that found "a high incidence of skin rashes possibly associated with arsenic exposure." As a result, the company "voluntarily moved to increase industrial hygiene and health testing and established protocols to move workers out of high exposure areas if necessary," she said. Average arsenic exposure in the smelter has declined by 72 per cent since 2012,

the company says.

But samples analyzed recently by Swiss researchers found that the soil around the smelter was heavily contaminated with arsenic and other heavy metals. The tests also found elevated levels of arsenic in leaves and grass in the area, and in hair samples of employees and residents who live near the smelter. "The values are alarming and show that the population of Tsumeb is massively exposed to arsenic," said Adrien Mestrot, professor of soil sciences at the University of Bern in Switzerland. "Further tests should definitely be carried out to understand the true extent of the health impacts of the smelter," he said after analyzing dozens of samples from the area around the smelter.

Despite repeated inquiries, neither DPM nor Sinomine was willing to disclose how much arsenic trioxide the Canadian company has left behind in Tsumeb after a decade of processing copper from its Bulgarian mine. Former managers say it could amount to about 300,000 tonnes – one of the world's largest accu-

mulations of arsenic waste.

Ms. Cameron, in response to questions from The Globe, said the arsenic waste is securely bagged to prevent any air contamination, and the site is regularly inspected and independently audited. "DPM designed and constructed the facility in line with Namibian and international standards, which included the installation of impermeable liners to prevent groundwater contamination," she said.

In Northern Canada, faced with a similar stockpile of arsenic trioxide at the now-defunct Giant Mine in Yellowknife, the federal government is going much further than this. The mine's 237,000 tonnes of arsenic waste are being stored in sealed concrete chambers, 76 metres below ground, and the ground around the chambers will be permanently frozen to prevent the waste from leaching into groundwater. The massive cleanup project will cost an estimated \$4.38-billion.

Ms. Cameron declined to answer questions about any plans for the arsenic waste stockpile in Tsumeb, saying that the smelter's new owners should answer. She also declined to answer questions about DPM's internal testing of arsenic levels in employees from 2010 to 2024, how many employees had unsafe levels, and how the company handled those cases.

A spokesperson for the smelter, Alina Garises, also declined to answer any questions. She said that DPM's responses were "sufficient."

Sinomine, which operates in more than 40 countries worldwide, says it plans to expand the smelter's output and revamp it to add germanium and zinc to its production lines.

Citizens of foreign countries have few levers to seek answers from Canadian companies. Ottawa created the Canadian Ombudsperson for Responsible Enterprise (CORE) in 2019 to probe complaints about human rights and environmental issues at Canadian companies operating abroad in the garment and extractive sectors, but CORE remains almost unknown to people in remote countries such as Namibia. The ombudsperson also lacks investigative powers and cannot compel witnesses to provide testimony or documents.

Scientific studies since 2011 have found evidence that many people in Tsumeb, including residents and former workers, have elevated levels of arsenic in their system. But little has been done about it, many residents allege.

The saga began in 2003, when DPM acquired the Chelopech mine in Bulgaria, one of the biggest gold and copper mines in the country. Because of the exceptionally high arsenic content in its copper minerals, the concentrate needed special processing – and the Bulgarian government had decreed in 1990 that it was too hazardous to process it in that country. European Union laws also prohibit the commercial processing of minerals that contain such high levels of

arsenic.

DPM's solution, in 2010, was to acquire the Tsumeb smelter in Namibia, where regulation is weaker.

For more than a decade after the acquisition, it loaded the concentrate onto rail wagons in Bulgaria, sent it to a port on the Black Sea and shipped it more than 14,000 kilometres to the Namibian port of Walvis Bay, where it was placed back onto rail cars for the final journey to Tsumeb.

At the smelter, the copper was melted at temperatures of more than 1,200 C, separating it from the arsenic and other toxins. The arsenic was carted from the smelter in sacks, dumped in a landfill and flatted by a bulldozer.

Today, at the hazardous waste site on a hill south of the smelter, two huge piles of white powder are visible. This is the arsenic trioxide, the most dangerous waste product from copper production. Even a fraction of a gram can be fatal if swallowed.

The fumes and dust are so hazardous that the smelter's workers wear full-body protective suits, gloves, helmets and gas masks when handling the waste.

In its latest annual report, before the smelter's sale, DPM said the rehabilitation costs at Tsumeb would amount to about US\$23-million, though it gave no details of what exactly this would include.

"DPM continues to work on developing alternative ways to deal with the arsenic waste which is generated from the smelting of complex concentrates that is currently deposited in an onsite hazardous waste management facility, which has a defined life capacity," the company said in a corporate filing in March, 2024.

It listed several "environmental liabilities" at the smelter, including a "stockpile" of arsenic-containing dust. The stockpile will be "capped," it said, but it is unclear when this will happen and what risks might be posed by the uncapped stockpile.

DPM and Sinomine would not comment on the possible rehabilitation work or the corporate filings on environmental liabilities and the lifespan of the waste site.

Studies have shown a link between long-term exposure to arsenic and increased child mortality, impaired cognitive development, kidney failure and various types of cancer in adolescents.

The symptoms of exposure are varied and difficult to trace back to the original source, but the first signs are often skin problems, particularly skin discoloration and hardening, or lung problems, often in the form of bronchitis. Because of its toxicity, arsenic trioxide irritates the skin and can cause severe rashes.

Residents of Tsumeb and former employees of the smelter often report that they suffer from pustules, blisters and other skin problems. Headaches, nausea and respiratory problems are also common.



Festus Gawab, front, and Johnny Ngongo work on a citrus farm in Tsumeb and have both suffered from headaches and nausea when the wind is blowing from the direction of the copper smelter.

ERIN CONWAY-SMITH/THE GLOBE AND MAIL



Above: Nikiasius Hangula, a retired smelter worker, suffers from a range of health issues such as stomach pains and kidney damage.

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Right: Mr. Gawab, shows the skin sores and rashes on his body. He says his children, ages 4 and 6, have similar symptoms.

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In 2023, a Tsumeb community group organized protests against DPM. Hundreds of people marched in the streets, rallying outside the smelter gates. They demanded the resignation of the smelter's managers and regular medical examinations for the town's residents to monitor the health impact of arsenic and other metals in the air.

"We are exposed to arsenic and toxic exposure on a daily basis," the group said in a petition. "We want Canadians to visit Tsumeb and see for themselves."

Lischen Claasen, a 48-year-old kindergarten teacher who helped found the community group that organized the protests, describes a range of respiratory problems that became increasingly common in the town as the smelter expanded.

"It's difficult to breathe," she says. "What's going to happen to our children? We are dying."

Another member of the group, 51-year-old mechanic Richard Naobeb, said the town was a "paradise" before the smelter opened. Now it is difficult even to grow a garden, he says. "Time and again, we feel something burning in our eyes and we are coughing."

Almost everyone in town, it seems, has similar experiences. As the group's members talk to The Globe on a hotel terrace in Tsumeb, another resident overhears the conversation and chimes in with a litany of her own experiences: skin rashes, sinus problems and breathing issues.

In a media presentation in July, 2024, DPM said that it conducted testing in the Tsumeb community in 2016 and 2018, finding arsenic levels below the international limit. It also did community testing in 2023, but the company says it cannot release the latest results because of the smelter's sale to a new owner.

De La Ray Badenhorst, a physician who has worked in Tsumeb for more than two decades, including several years at the smelter itself, says he sees a high rate of illnesses among the smelter's workers and the town's residents, with symptoms that include skin rashes, itching skin, allergies, coughing, sneezing, viral infections and upper respiratory problems.

"The moment I walk through the gate at the smelter, my skin is itching from the mixed dust," he said. "That fine dust is all over the place. When the wind blows, where does it go?"

Workers at the smelter often have their urine tested to check for traces of arsenic, he said. But when their arsenic levels are high, they are simply transferred to less hazardous jobs at the smelter without being informed of the test results, he said.

A group of Tsumeb business leaders, in a letter to the Namibia Competition Commission in early 2024, said the commission should not approve DPM's sale of the smelter without an agreement that the arsenic waste will be safely removed and all Tsumeb residents will be tested for arsenic, with a pledge of compensation for any illnesses caused by the arsenic.

But the competition commission, after five months of review, allowed the sale to proceed without setting any conditions on arsenic storage or medical tests. It set only one condition: The new Chinese owners must continue to employ the smelter's Tsumeb-based staff for at least three more years.

The tests at the University of Bern focused on hair samples from Tsumeb's residents, since arsenic accumulates in hair. The highest levels of arsenic were found in smelter employees and among residents living west of the smelter – an area that suffers the greatest impact from emissions and dust because of the prevailing winds.

Each of the 12 samples from Tsumeb showed arsenic levels of more than one milligram per kilogram – the exposure limit that some previous studies have recommended. In eight of the samples, the arsenic level was at least three times above this level. One employee's arsenic level was 20 times higher. Compared to hair samples of people in Namibia and Switzerland who are not exposed to arsenic, the levels in Tsumeb were up to 100 times higher.

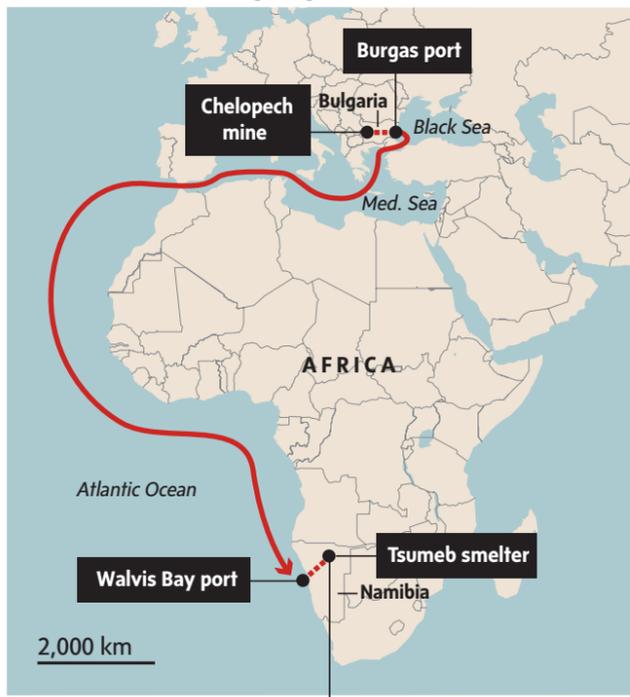
The tests also found that the soil near the smelter was heavily contaminated with arsenic and other heavy metals such as lead and copper.

"These values, with up to 2 per cent arsenic in the soil, are extremely high and comparable to other soils contaminated by smelting," Prof. Mestrot said.

The company says it has planted 15,000 tamarisk shrubs around the smelting works to absorb heavy metals from the soil and store them in the wood. When the shrubs are big enough,

How arsenic reached Africa

Copper concentrate, with a high arsenic content, was transported by rail from Chelopech to a Bulgarian port, and then shipped to Namibia and taken by rail to the town of Tsumeb. A satellite photo shows the smelter, the arsenic waste site, and the beginning of the residential area.



JOHN SOPINSKI/THE GLOBE AND MAIL SOURCE: CEE BANKWATCH NETWORK, EARTHLIFE NAMIBIA ANDZA ZEMIATA – FRIENDS OF THE EARTH BULGARIA; OPENSTREET MAP; GOOGLE MAPS

they are burned in the smelter's furnace.

The company says it monitors air and water quality with six air-measuring stations and 31 groundwater boreholes in and around the smelter. The monitoring found that the air and water samples were "compliant" with Namibian and international standards, it says. But neither DPM nor Sinomine would comment on the arsenic levels in the samples analyzed by the University of Bern.

Many of the issues surrounding the smelter have been well known for years. But residents and workers have been reluctant to challenge DPM, the most powerful company in the town for more than a decade. In addition to its 650 workers, the company employed hundreds of contractors for cleaning, maintenance and transport, and its wages were

much higher than most other jobs in the country.

Its smelter is considered part of a Namibian export processing zone, which drastically reduced DPM's tax obligations in Namibia.

On huge billboards at the entrance to Tsumeb, the company proclaims that its people are "stewards of the environment." Its name is prominent all over the town: It sponsored the shade roof in front of the post office building; it organizes the annual golf tournament; it is the main sponsor of the town's yearly copper festival; it donates laptops to schools, renovates soccer fields and built an open-air gym in the town.

The company and the Namibian government have been aware of the arsenic issues for many years.

Researchers from the Universi-

ty of Namibia, in collaboration with the Federal Institute for Geosciences and Natural Resources in Germany, tested 148 people for arsenic and other heavy metals in their blood and urine in 2011. One in six people had arsenic levels in their urine that were above the World Health Organization limit. The study, co-financed by the Namibian government, concluded that the high levels were mainly caused by inhaling contaminated dust, having contact with contaminated soil and consuming produce from gardens.

In 2014, the same research group analyzed 43 samples of tomatoes, carrots, corn and pumpkin from Tsumeb for heavy metals and arsenic. All samples showed a significant accumulation of lead, cadmium and arsenic. "These elements can severely impact human health if contaminated fruits and vegetables are consumed regularly or in significant quantities," the study states.

The researchers recommended that agricultural production should be reduced or completely banned in zones around the smelter. Leafy and root vegetables, which accumulate heavy metals, should be banned in the city and on farmland up to 10 kilometres west of the smelter, they said. But the government took no action.

In 2020, researchers from Australia concluded that the people of Tsumeb are at an increased risk of cancer owing to dust pollution, especially through their daily diet. The researchers found that the residents were still exposed to dust from the smelter's waste sites and its daily operations.

The volatile dust from the waste dumps, including the arsenic dump, was particularly worrying because it was fine-grained and had a high content of toxic elements, the researchers found.

"The smelter in Tsumeb is dirty and dusty compared to similar operations," said Mark Patrick Taylor, an environmental scientist and lead author of the Australian study, who has been studying the environmental impact of mines around the world for 40 years.

Prof. Taylor criticizes the fact that DPM is now leaving Tsumeb without first cleaning up the pollution. "The smelter will continue to be a problem for future generations," he said.

Studies have also repeatedly shown the health risks for the smelter's workers. One study, co-financed by the United Nations Environmental Programme, concluded in 2012 that the filters used to process the Bulgarian copper were not equipped adequately for processing concentrate with high arsenic levels. As a result, gaseous arsenic evaporated into the environment and posed a risk to smelter workers, it said.

Many of the former employees, plagued by illnesses, have formed a group to seek medical care and financial compensation from DPM. "The problems in the smelter only started with DPM and the copper from Bulgaria," said Nikasius Hangula, a 70-year-old former smelter worker who retired in 2014.

He and his co-workers in the smelter furnace, he said, began noticing an unbearable itching on their skin, and rashes that turned into blisters and left open wounds. "The smoke got you in the nose," he said. "It felt like burning. I became weaker and weaker."

When workers complained, the company told them they weren't wearing their protective clothing properly, or they needed a new respirator, but nothing made any difference, Mr. Hangula said. "They said we were complaining too much. I was afraid of being fired. Some of those who complained were fired."

Today he suffers from stomach pains, kidney damage, fatigue and frequent coughing, and his arm shakes uncontrollably. He can't afford the battery of tests that he would need to determine the cause. Instead he goes to a state hospital, where he is given some pills and sent away.

Neither DPM nor Sinomine would comment on the request for compensation by the former workers. Nor would they comment on the request by community members for medical testing.

During a visit to the smelter in August by a researcher for this media investigation, there were signs that the arsenic landfill is getting bigger. A group of men, wearing white full-body suits and gas masks, were shovelling whitish-grey powder into a pile. The smelter's vice-president of business development, Zebra Kasete, confirmed that the landfill will be expanded.

One potential problem is that the landfill is located above a major aquifer in a porous zone

known for geological faults and sinkholes. Arsenic trioxide is water-soluble and can be washed out by heavy rain. If there is a leak in the landfill's lining, the arsenic could diffuse into the soil over a large area and reach the groundwater, contaminating the drinking water for the entire town.

Civil society groups, such as Earthlife Namibia, have been raising concerns about the landfill issue since 2015. A British-based environmental consulting group, SLR, studied the groundwater issue in 2016 when DPM was planning to expand the smelter. It found that arsenic and other chemicals could already be measured in some boreholes on the smelter site at levels higher than Namibia's guidelines, and it warned that the heavy metals could spread from the smelter toward the local groundwater.

Hans Nolte, who ran the smelter for DPM from 2010 to 2015, says he never suffered any illnesses there – but he is now worried about the risks of the arsenic landfill. He lives in the Tsumeb area and has his own farm, which could be affected if the groundwater is contaminated.

The landfill, originally built to store arsenic trioxide that had been lying around unprotected on the site from the time before DPM, has a solid lining that includes several layers of plastic, Mr. Nolte says. "But it was never planned for the landfill to be filled to such an extent. Even if the piles are now watered, the arsenic powder can never be kept moist enough in the dry season to prevent it from being blown away by the wind."

Long-term, safe disposal of the arsenic trioxide was already being discussed by the Namibian government in 2015, but the plans were not pursued. "The landfill should be taken over by an independent, external party that specializes in waste disposal," Mr. Nolte said.

No such plans have been announced at Tsumeb. Nor are there any plans to store the waste in sealed chambers far underground, as the Canadian government is doing in Yellowknife. This means an uncertain fate for the town's residents.

Christa and Horst Kuehl, who both worked for several years in Tsumeb, bought a 10-hectare farm a few kilometres outside the town in 2018 as a retirement plan. They cleared the land, planted thousands of citrus trees and hoped that the air would improve the health of Mr. Kuehl, who was suffering from a lack of oxygen because of polyps that kept forming in his nose. Instead, they noticed clouds of acrid gases that wafted across from the smelter. And, like her farm workers and other residents, Ms. Kuehl soon became sick.

"All of us have the same symptoms," she said. "Headaches, nausea, burning eyes, stomach pain, weakness and tiredness."

She often gets mouth ulcers, which soon clear up when she travels outside the town. She notices other odd things on the farm: dozens of dead birds; trees that don't seem to flower properly; plants that are covered in dust.

When Ms. Kuehl and her neighbours arranged testing of plant leaves, fruit and vegetables on their land, the tests found high levels of arsenic. Separate tests at the University of Bern confirmed that arsenic was present in tree leaves and dried grass on her farm, at levels far higher than Swiss limits for food.

Ms. Kuehl has often confronted DPM's officials with evidence from her farm. "They come by and listen to us – and then nothing happens," she says.

Whenever she sees the gas fumes around her farm, she sends dozens of photos to Mr. Kasete and other smelter managers. She also sent the photos to DPM in Canada. "This is killing us," she told the company. "We are getting VERY sick."

She has received no response from officials at DPM's head office in Toronto. When asked about her case, the company would not comment.

Ms. Kuehl and her husband have tried to sell the farm, putting it on the market last year, but they received no offers.

"You can't live here, but we're forced to stay," she said. "Some days I just cry. There's no future on this farm. It's heartbreaking."

With a report from Ester Mbathera in Tsumeb.

Samuel Schlaefli is an independent journalist whose travel costs were funded by the Swiss-based Koalition für Konzernverantwortung, a human-rights and environmental coalition, which also funded the arsenic tests at the University of Bern. It did not direct, review or approve the article.



Lischen Claasen, far right, a 48-year-old kindergarten teacher, helped found a community group to protest the copper plant's continuing operation in the town. SAMUEL SCHLAEFLI/THE GLOBE AND MAIL