

Backgrounder: SO₂ emissions in Aamjiwnaang First Nation

What is sulphur dioxide?

Sulphur dioxide, or SO₂, is a colourless gas linked to short term and chronic health issues in Aamjiwnaang First Nation. SO₂ is released from refineries, chemical and petrochemical plants, and other facilities in the Sarnia area.

Acid gas flaring at petroleum refineries is a major source of highly concentrated SO₂ emission spikes. These occur when acid gases containing hydrogen sulphide (H₂S) convert to SO₂ when combusted in flares. Acid gas flaring often occurs during operational failures, and equipment startup and shutdowns, causing increases in sulphur dioxide emissions.

For 2023, the facilities emitting the most SO₂ according to the government's National Pollutant Release Inventory (NPRI) in order from highest are Imperial Oil Refinery, Cabot Canada Limited, Shell Canada, Suncor Energy, and Nova Chemical (Corunna). Of these facilities, Imperial Oil, Shell and Suncor are petroleum refineries.

What are the health impacts of SO₂?

SO₂ is a dangerous pollutant linked to several respiratory issues. SO₂ pollution can cause mild to severe adverse impacts in sensitive individuals, such as those with asthma. Certain weather conditions that trap the pollution at low elevations can exacerbate the impacts.

Even short-term spikes in SO₂ pollution are highly dangerous to people with breathing and heart problems causing wheezing and tightness in their chest. Although healthy individuals are less sensitive, they may also experience difficulties breathing.

The highest incidences of new onset asthma cases were found in young children born in the Sarnia area, the city with the high SO₂ and PM_{2.5} pollution, compared to two other Southwestern Ontario cities.

How are SO₂ emissions in Aamjiwnaang regulated?

In 2018, the Ontario government introduced new, health-based SO₂ standards that lowered the amount of the pollutant that any industrial facility in the province could release into the air. These standards limit emissions from a facility such that the hourly SO₂ maximum concentration outside the fence line does not exceed 100 µg/m³ (40 ppb)

based on computer modelling. This type of standard is referred to as Point of Impingement (POI) standard.

However, despite refineries being a major source of SO₂ in Chemical Valley, they are exempt from this standard. Instead, the Ontario government made a new regulation governing SO₂ emissions from refineries. That regulation permits refineries not to comply with the new health-based SO₂ standards as long as they meet certain other emissions limits and technology and reporting requirements, while giving the refineries exceptionally long timelines to meet many of these requirements.

Unfortunately, these regulations have not prevented industry from releasing dangerous levels of SO₂. Although the rules impose financial penalties for flaring, these penalties are low enough that companies can absorb them as a 'cost of doing business.' On 11 separate occasions between July and October 2019, Imperial Oil's Sarnia, Ont. refinery released more SO₂ than allowed by regulations. The Ministry levied penalties totaling \$801,908.80 against Imperial Oil for these breaches. Despite this, IOL continues to violate the rules.

This year, the Ontario government released a report detailing its findings under the Sarnia Area Environmental Health Project (SAEHP). The report highlighted the impact that SO₂ has had in Chemical Valley particularly during flaring. Although the report recommended that steps be taken to reduce flaring, the Ministry has taken no action and SO₂ levels remain high.

Dangerously high air pollution levels are not an isolated event for Aamjiwnaang; their community has faced systemic issues of environmental racism for decades.

What can be done to address SO₂ emissions in Aamjiwnaang?

The Lambton Industrial Meteorological Alert (LIMA) Regulation applies to the most highly industrialized area of Chemical Valley that surrounds Aamjiwnaang First Nation. The LIMA regulation requires facilities within that area to lower their SO₂ emissions if measured SO₂ levels exceed a threshold set out in the regulation for a 24-hour period. This regulation addresses cumulative effects since it makes all the facilities decrease their emissions to a lower emissions limit when overall SO₂ levels get too high at any air monitor within the area.

The problem is that both the threshold triggering protective action and the lower emissions limit have never been updated and are far too high to protect human health given what we know about SO₂. In 2017 the MECP consulted on updating the LIMA regulation but never followed through.

Updating LIMA is an important step the Ontario government can take to reduce dangerous SO₂ emissions in Aamjiwnaang. In particular, Aamjiwnaang believes the government should:

- Lower the SO₂ threshold that triggers emission reduction actions from 70 ppb over 24 hours to 10 ppb over 24 hours.
- Lower the SO₂ emissions limit that each facility must meet during a LIMA Alert from 160 ppb over 1hr to 19 ppb over 1 hour.
- Update the model used to demonstrate compliance with the SO₂ emissions limit from the obsolete Reg 346 to the current Reg 419 models.
- Ensure all air monitors in the LIMA area, including those in the Aamjiwnaang community, are included as monitors that could trigger a LIMA alert.

In addition to updating the LIMA regulation, the Ontario government could refuse to renew Cabot Canada's Environmental Compliance Approval unless Cabot Canada can demonstrate to Aamjiwnaang that they can meet the SO₂ standard in Reg 419. The company's Environmental Compliance Approval is currently posted for an update and renewal on the Environmental Registry of Ontario. According to documents in their renewal application, their maximum POI is over 500 per cent of the Reg 419 health-based air quality standard.