

Air Quality



Air Quality

Poor air quality leads to impacts on the environment, human health and the economy.¹ With the damage to global health from air pollution estimated at US\$8 trillion annually, or about 6% of global gross domestic product, air pollution continues to be a global concern.² Governments increasingly require that industrial air emissions are monitored, mitigated and disclosed to public inventories such as the [Toxics Release Inventory](#) in the United States or the [National Pollutant Release Inventory](#) in Canada.

Mining and mineral processing can impact air quality through emissions from activities like drilling, blasting, crushing, collection and storage, and transportation along the supply chain. Managing these emissions — through technological and process improvements — allows companies to limit their potential air impacts while benefiting from operational efficiencies and cost reduction.

Teck has an ongoing commitment to improve air quality management, and we undertake comprehensive monitoring and reporting on air quality in the areas of our operations. This is a priority for Teck, as air quality continues to be identified as a key concern by our communities of interest. In particular, dust has been identified

as a key concern by local and regional communities around our steelmaking operations in the Elk Valley in British Columbia (B.C.), at Trail Operations in B.C., at Red Dog Operations (RDO) in Alaska and at Carmen de Andacollo Operations (CdA) in Chile. In 2021, wildfires and record-breaking warm temperatures also impacted air quality in local communities and at some of our Canadian operations. Teck continued to work with our local partners to support wildfire relief efforts during this time. As air quality issues require close collaboration with local stakeholders and Indigenous Peoples, we continue to explore initiatives to partner with communities across our operations.

GRI Indicators and Topic Boundary

305-103, 305-7

This topic is considered material by our employees, Indigenous Peoples, local communities, government and regulators, and society in the context of all of Teck's sites.

How Does Teck Manage This Topic?

Information about how we manage air quality, including relevant policies, management practices and systems, is available for [download on our website](#).

¹ Canada's Air Quality. Government of Canada. 2021. ² Pollution. The World Bank. 2021.

2021 Highlights

100%

of community-based air quality stations recording annual average values were within the World Health Organization (WHO) guideline interim target value for ambient concentrations of particulate matter less than 2.5 microns in size

Implemented initiatives to improve air quality monitoring and to minimize impacts from our activities on communities at our operations in the Elk Valley, and at our Trail, Carmen de Andacollo and Red Dog operations

Our Performance in Air Quality in 2021

Our Targets and Commitments Our goal is to continuously improve air quality and reduce dust emissions for the benefit of workers, communities and the environment in areas affected by our activities.

Performance Metrics

Indicator

Sulphur dioxide (SO₂) emissions from stacks, stationary and mobile fossil fuel combustion

2021: 3,094 tonnes

2020: 3,812 tonnes

2019: 3,853 tonnes

Indicator

% of community-based air quality stations with annual mean concentrations of ambient PM_{2.5} within the World Health Organization guideline interim target value of 10 µg/m³

2021: 100% of stations

2020: 100% of stations

2019: 100% of stations

Indicator

% of community-based air quality stations with annual mean concentrations of ambient PM₁₀ within the World Health Organization guideline interim target value of 20 µg/m³

2021: 75% of stations

2020: 75% of stations

2019: 75% of stations

Minimizing Emissions to Improve Air Quality

In 2021, we implemented measures to minimize impacts on the local air quality within the vicinity of our activities.

Table 2: Air Quality Improvements in 2021

Operation	Activities
Elk Valley steelmaking coal operations	<p>Continued to implement on-site and off-site real-time monitoring of particulate concentrations and meteorological conditions to assist with dust mitigation planning and incident investigation.</p> <p>Integrated two air monitors based in Sparwood and Elkford into the B.C. Air Quality Database, thereby giving public access and transparency to Teck air quality data. Ozone monitoring was also added in Sparwood, thereby enabling a calculation of an Air Quality Health Index (AQHI) value for the Elk Valley in 2022.</p>
Trail Operations	<p>Continued to implement dust management initiatives to support additional reductions of metals in ambient air in the community. Refined the site's wind warning alert and response program, and updated site controls to mitigate fugitive dust from roads and material handling areas during windy periods. Modelled site winds to better understand fugitive dust dispersion from key areas, to update source contribution and to inform the next steps of reduction projects.</p>
Carmen de Andacollo Operations	<p>Continued to implement on-site dust management initiatives, including installing cameras to remotely monitor the trajectory of blasting and measure the efficacy of our dust mitigation measures. An update of the Environmental Monitoring Platform used in the blasting process was also developed, which integrates a geographic information systems (GIS) map to visualize the stations and meteorological information. Added dust suppressant measures within the city to enhance dust mitigation.</p> <p>Continued to conduct research on innovative approaches that may reduce dust emissions, including the use of electromagnetic waves to decrease airborne particles.</p>
Red Dog Operations	<p>Continued to monitor and evaluate performance and evaluate opportunities for further improvement. Since mine operations commenced in 1989, Red Dog Operations has invested more than US\$25 million in a program to reduce fugitive dust emissions through operational and facility improvements and activities.</p>

Case Study: Improving Air Quality at Andacollo through a Sustainability-Based Mining Operational Model

Teck's Carmen de Andacollo (CdA) Operations is located in the Coquimbo Region of central Chile, directly adjacent to the town of Andacollo, which has had a long history of mining. In 2009, the air around Andacollo was found to be high in particulate matter of a size less than 10 microns (known as PM₁₀), thought to be due to the strong mining tradition in the area, the mountainous landscape and the arid climate. As a result of this finding, local and national governments in Chile designated the area as a PM₁₀ saturated zone. In response, Teck specialists at CdA worked with local

government and communities to develop the Atmospheric Decontamination Plan (ADP), with a goal of lowering dust emissions by 65% by 2017. Since the launch of the ADP, Teck has worked intensively on air quality research and innovation projects that resulted in a 78% reduction in PM₁₀ by 2017. In 2021, we continued to conduct research on innovative approaches that may further reduce dust emissions. One such initiative we are exploring is the use of electromagnetic waves to decrease airborne PM₁₀ particles. Read the full case study at teck.com/news/stories.

Monitoring and Reporting

The most material air quality issues relate to metals and SO₂ near our Trail Operations metallurgical facility, and particulate emissions at our mining operations. In addition to monitoring these two material indicators, our operations monitor and report on other air emission parameters in accordance with permit and regulatory requirements.

As shown in Table 3, SO₂ emissions from stacks and fossil fuel emissions in 2021 were approximately 3,094 tonnes – almost a 19% reduction from 2020. Over a four-year period, SO₂ emissions followed a stable trend and improvement initiatives then enabled a significant reduction in 2021. See the Technology and Innovation section on page 14 for more details. Trail Operations is the most significant source of SO₂ emissions for Teck and, as a result, all other operations have been aggregated in Table 3. Full results per operation are available in the [2021 Sustainability Performance Data](#).

Trail has been driving down lead levels in the air for several decades. Improvement projects implemented through Trail Operations' Fugitive Dust Emission Reduction program have reduced lead levels in the community by 80% since 2012.

Technology and Innovation

Trail is implementing a three-year program to reduce SO₂ emissions. As part of this program, the expansion of SO₂ scrubbing operations completed in late 2020 resulted in significantly reduced SO₂ emissions in 2021. The \$44.8 million KIVCET Dryer Project will allow for lower drying temperatures, which will further reduce community SO₂ emissions, starting in 2023. These improvements are being implemented in accordance with Trail's provincial permit limits for SO₂ concentrations at community stations, which became more stringent in 2021 and will further decrease in 2023.

Table 3: SO₂ Emissions from Stacks, Stationary and Mobile Fossil Fuel Combustion (tonnes)^{(1),(2),(3),(4),(5)}

Operation	2021	2020	2019	2018
All other operations	15.7	28.7	42.0	61.4
Trail Operations	3,078.0	3,783.5	3,811.0	3,598.0
Total	3,093.6	3,812.2	3,853.0	3,659.4

- (1) Rounding of individual numbers may cause a discrepancy in the total value.
- (2) Aggregate data for all other operations presented here, as numbers are insignificant compared to Trail. See our [website](#) for the full set of data.
- (3) Information current at time of publication. However, values will be added, confirmed and/or changed once regulatory reporting for the 2021 period is complete. See our website for up-to-date information.
- (4) Requirements and methods for determining air emissions can vary widely. Not all sites have monitoring equipment in place to measure releases from all sources and activities, and the frequency of sampling can vary.
- (5) Our Canadian sites report annually to the National Pollutant Release Inventory (NPRI) and American operations report to the Toxics Release Inventory (TRI); NPRI and TRI have different reporting requirements and calculation methods. Information in this table may not reflect exactly the contents of NPRI and/or TRI reports, due to different reporting definitions concerning site boundaries as well as the inclusion of mobile equipment in the above table, which is not required in some regulatory reporting requirements.

Ambient Air Quality Monitoring

As part of our ambient air quality monitoring program, we measure the concentration of particulate matter of a size less than 10 microns (PM₁₀) and particulate matter of a size less than 2.5 microns (PM_{2.5}) at monitoring stations. These monitoring stations use standardized equipment, per permit and regulatory requirements, and are located on our sites and in a number of community centres. Tables 4 and 5 summarize the ambient air quality during 2021 as measured at a select number of community-based monitoring stations that we manage, based on the significant proximity of the location to our operations. Two values are presented:

- The annual average concentration that is based on the daily 24-hour average concentrations; this value reflects prolonged or repeated exposures over longer periods
- The annual peak 24-hour indicator that is based on the 98th percentile of the daily 24-hour average concentrations; this value reflects immediate exposures

At these monitoring stations, ambient air quality not only reflects the activities at our operations, but also other activities in the area such as other industries, vehicle traffic, firewood burning, forest fires and waste burning.

In 2021, record-breaking temperatures and wildfires in B.C. impacted air quality in local communities and at some of our operations. This is reflected in the increase in particulate matter measured at the Downtown Sparwood and Elkford High School air quality monitoring stations.

For 100% of the stations listed in Table 4, the annual average concentration of PM_{2.5} was below the WHO Guideline value of 10 µg/m³. For the annual average concentration of PM₁₀ at the stations listed in Table 5, 75% of the stations were below the WHO Guideline value of 20 µg/m³.

Table 4: Ambient Particulate Matter of Size Less Than 2.5 Microns ($\mu\text{g}/\text{m}^3$)

Station	Nearest Operation	2021		2020		2019	
		Average Annual	98th Percentile	Average Annual	98th Percentile	Average Annual	98th Percentile
Urmeneta	Carmen de Andacollo	9	18	9	14	7	14
Downtown Sparwood	Elkview	9	46	6	15	7	14
Elkford High School	Greenhills	7	49	5	31	4	16

Table 5: Ambient Particulate Matter of Size Less Than 10 Microns ($\mu\text{g}/\text{m}^3$)

Station	Nearest Operation	2021		2020		2019	
		Average Annual	98th Percentile	Average Annual	98th Percentile	Average Annual	98th Percentile
Urmeneta	Carmen de Andacollo	36	65	35	57	34	59
Downtown Sparwood	Elkview	17 ⁽¹⁾	55	11	34 ⁽¹⁾	13	44
Elkford High School	Greenhills	12	62	9	47	10	43
Butler Park	Trail	17	95	15	63	14	28

(1) Incomplete hourly data set, per the Canadian Council of Ministers of the Environment: Criteria ii.

For more information about our emissions to air, such as nitrous oxides, volatile organic compounds, and mercury, visit the [National Pollutant Release Inventory](#) for our Canadian operations and the [Toxics Release Inventory](#) for our American operations.

Significant Incidents and Non-Compliance Related to Air Quality³

We assess the severity of environmental incidents based on potential environmental, safety, community, reputational and financial impacts. Based on our incident severity criteria, there were no significant incidents related to air quality in 2021. There were also no significant charges, fines and penalties for non-compliance related to air quality in 2021.

³ Definition of significant environmental incidents is on page 50.