

Air Quality

A photograph showing two workers in safety gear (hard hats, high-visibility vests) kneeling on a rocky outcrop, reviewing a map or document. The background features a clear blue sky with scattered clouds and several tall evergreen trees. The scene is set in a natural, outdoor environment, likely a mining or construction site.

Economic growth can be accompanied by an increase in air pollution, which impacts human health and ecosystems. With better knowledge, alternative consumption and production models, as well as innovative technological solutions, many countries, cities and businesses are now successfully reducing air pollution.¹⁵

Air pollutants associated with mining and mineral processing can include particulate matter (e.g., fine and coarse dust that can include minerals and metals) and gases. Dust at operations is generated by a variety of sources, such as vehicle traffic on mine roads, dumping rock onto waste piles, storing materials, blasting and crushing. Dust can also be generated during the transportation of mineral products along the supply chain.

To maintain a transparent approach to managing these pollutants, several governments, including the Canadian and American governments, require companies to monitor and mitigate their impacts on air quality and to disclose their emissions publicly through inventories such as the [Toxic Release Inventory](#) in the United States and the [National Pollutant Release Inventory](#) in Canada.

Our communities and stakeholders have increasingly identified air quality as a key concern at many of our operations. For example, in the Elk Valley and at our Carmen de Andacollo Operations in Chile, nearby residents have reported dust in relation to mine operations as a concern. Not only do we see increasing community concerns related to air emissions near many of our operations, but also along our supply chain through transportation of our products. As such, air quality issues require close collaboration with local stakeholders. In 2018, we embraced and are continuing to explore numerous initiatives across our operations to improve air quality, as described in Table 31.

¹⁵ Towards a Pollution-Free Planet. UN Environment Assembly, 2017.

Our Performance in Air Quality in 2018

Our Targets and Commitments: Our vision is to continually improve air quality for the benefit of workers, communities and the environment in areas affected by our activities. The following table summarizes our performance against our 2020 sustainability goals and targets for air quality.

2020 Sustainability Strategy Goal	Status	Summary of Progress in 2018
Improve monitoring and understanding of our releases to air and the potential impacts on people, communities and the environment.	On track	Improvements to our ambient air quality monitoring programs were implemented at our Elkview, Line Creek and Cardinal River operations in 2018. Information on current emission monitoring programs and dust management practices have also been collected for all operations. Studies were undertaken at our Red Dog Operations to better understand impacts of historic fugitive dust on surrounding flora and fauna.
In consultation with communities, governments and other organizations, set air quality goals and establish risk-based action plans to achieve goals.	On track	Targets that were set for particulate matter emissions at Carmen de Andacollo Operations and targets for lead concentrations in ambient air at Trail Operations were achieved ahead of schedule.
Strengthen the integration of air quality considerations into early stage project development.	On track	A list of air quality considerations was developed for incorporation into early project planning stages and knowledge sessions were held with the Project Development Group.

2018 Key Performance Indicators

2018: 3,659 tonnes	2018: 100% of stations	2018: 50% of stations
2017: 4,894 tonnes	2017: 100% of stations	2017: 75% of stations
Indicator Sulphur dioxide emissions from stacks, stationary and mobile fossil fuel combustion	Indicator % of community-based air quality stations with annual mean concentrations of ambient PM _{2.5} within the World Health Organization guidelines	Indicator % of community-based air quality stations with annual mean concentrations of ambient PM ₁₀ within the World Health Organization guideline value of 20 µg/m ³

Minimizing Emissions to Improve Air Quality

In 2018, we implemented measures to minimize impacts on the local air quality within the vicinity of our activities.

Table 31: Air Quality Improvements in 2018

Operation	2018 Improvement
Elk Valley	At our steelmaking coal operations in the Elk Valley, we engaged communities through newsletters and open houses to report on our air quality performance. In addition, a new ambient air quality monitoring station was installed in Sparwood Heights to better understand the impacts of our operations on the community so that we are better able to adjust our site activities to manage those impacts. We conducted dust management activities and evaluated more than 50 air quality improvement initiatives across the Elk Valley. Programs that are currently being piloted include modelling to evaluate the effectiveness of various mitigation techniques on areas that are susceptible to wind erosion, the application of water to blast patterns prior to blasting, and the use of technology to reduce or eliminate the need for a coal dryer. Additional information on our efforts is available on our website.
Trail	We continued to implement dust management initiatives to support additional reductions in the level of metals in ambient air in our surrounding community. Activities undertaken in 2018 include the installation of a wind fence to reduce dust from the area where concentrates are mixed, as well as the use of a new road dust monitoring tool that is helping to identify areas of higher dusting and enable more effective mitigation.
Carmen de Andacollo	With the achievement of a 78% reduction in PM₁₀ emissions from 2010 to 2017, we continued to evaluate opportunities to further reduce fugitive dust. We are partnering with industry peers and research organizations to find and implement innovative solutions and to evaluate different atmospheric variables and conditions across various mining activities. The communities team also engaged with local residents to address their concerns regarding dust generated from operating activities.

Improving Community Ambient Air Quality

Trail Operations has been achieving success in improving community ambient air quality, and demonstrating the success of investments in operational improvements. Lead in community ambient air has reduced by 47% since 2016 and the 2018 annual average for lead in ambient air at the Trail monitoring station was the lowest ever recorded annual average. In partnership with the Trail Area Health and Environment Committee, we continue to focus on improving our environmental performance and working with the community to improve our community air quality.

Monitoring and Reporting

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

As shown in Table 32, sulphur dioxide emissions from stacks and fossil fuel emissions in 2018 were approximately 3,659 tonnes, compared to 4,894 tonnes in 2017. The decrease in emissions in 2018 was primarily due to a scheduled maintenance shutdown at Trail Operations.

Table 32: Sulphur Dioxide Emissions from Stacks, Stationary and Mobile Fossil Fuel Combustion (tonnes) ^{(2),(3),(4)}

Operation	2018	2017	2016	2015
Cardinal River	4.9	3.6	7.6	2.9
Coal Mountain	1.1	1.4	3.5	0.1
Elkview	6.2	6.4	5.4	0.6
Fording River	15.8	21.7	3.6	1.2
Greenhills	4.6	4.7	4.5	2.7
Highland Valley Copper ⁽¹⁾	1.8	2.1	1.6	36.0
Line Creek	1.2	2.1	1.1	0.3
Pend Oreille	6.3	4.7	4.4	3.8
Quebrada Blanca	19.5	33.7	18.8	385.1
Trail	3,598.0	4,814.0	4,665.0	4,069.5
Total	3,659.4	4,894.4	4,717.9	4,504.8

(1) In 2015, Highland Valley Copper's SO₂ emissions included those from blasting.

(2) Information current at time of publication. However, values will be added, confirmed and/or changed once regulatory reporting for the 2018 period is complete. See our website for up-to-date information.

(3) 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.

(4) Our Canadian sites report annually to the National Pollutant Release Inventory (NPRI) and American operations report to the Toxic Release Inventory (TRI), which 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.

Table 33: Ambient Particulate Matter of Size Less Than 2.5 Microns (µg/m³)

Station	Nearest Operation	2018		2017		2016	
		Average Annual	98th Percentile	Average Annual	98th Percentile	Average Annual	98th Percentile
Urmeneta	Carmen de Andacollo	8	12	8	14	10	16
Downtown Sparwood	Elkview	8	52 ⁽¹⁾	5	21	5	14
Elkford High School	Greenhills	7	52 ⁽¹⁾	7	49	4	8

(1) Incomplete hourly data set, per the Canadian Council of Ministers of the Environment: Criteria ii. 2nd and 3rd quarter is not complete (<60% valid daily data sets in this quarter) for Elkview Operations and 3rd quarters are not complete for Greenhills Operations.

Table 34: Ambient Particulate Matter of Size Less Than 10 Microns ($\mu\text{g}/\text{m}^3$)

Station	Nearest Operation	2018		2017		2016	
		Average Annual	98th Percentile	Average Annual	98th Percentile	Average Annual	98th Percentile
Urmeneta	Carmen de Andacollo	33	51	29	51	37	70
Downtown Sparwood	Elkview	17	82	14	44	11	32
Elkford High School	Greenhills	11	57	10	46 ⁽¹⁾	7	19
Butler Park	Trail	26	165	18	54	18	38

(1) Incomplete hourly data set, per the Canadian Council of Ministers of the Environment: Criteria ii. 3rd quarter is not complete (<60% valid daily data sets in this quarter).

The primary way we are working towards reducing sulphur dioxide emissions at Trail is through the construction of our new acid plant. This new plant will reduce sulphur dioxide emissions from zinc operations, although total emissions will vary year to year, based on production. Construction is on schedule and the plant is expected to be operational in the summer of 2019.

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 (PM_{10}) and particulate matter of a size less than 2.5 microns ($\text{PM}_{2.5}$) 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. At these monitoring stations, ambient air quality not only reflects the activities at our operations, but also reflects other activities in the area, such as other industries, vehicle traffic, firewood burning, forest fires and waste burning.

In 2018, operations continued training related to fugitive dust management in their orientation and refresher programs. Specific training sessions were also held with the Vancouver Project Development Group to raise awareness of early stage project decisions on potential for fugitive dust emissions from operations.

Tables 33 and 34 summarize the ambient air quality during 2018 as measured at a number of community-based monitoring stations that we manage. 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

For all of the stations listed in Table 33, the annual average concentration of $\text{PM}_{2.5}$ was below the World Health Organization (WHO) Guideline value of $10 \mu\text{g}/\text{m}^3$. For the

annual average concentration of PM_{10} at the stations listed in Table 34, half of the stations were below the WHO Guideline value of $20 \mu\text{g}/\text{m}^3$. The primary cause of increased particulate matter at stations near our British Columbia-based operations in 2018 was due to forest fires in the region.

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

Outlook for Air Quality

In 2019, we will publicly provide, on our website, more detailed information on ambient air quality in the Elk Valley and performance against the British Columbia Ambient Air Quality Objectives as well as progress on projects that we are undertaking to manage fugitive dust. Across our operations, we will continue to evaluate more effective forms of dust suppressant for haul roads and tailings facilities, and conduct modelling to better understand how we can change our practices to improve air quality.

GRI Indicators and Topic Boundary

305-103, 305-7

This topic is considered most material by our employees, local communities, 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](#).