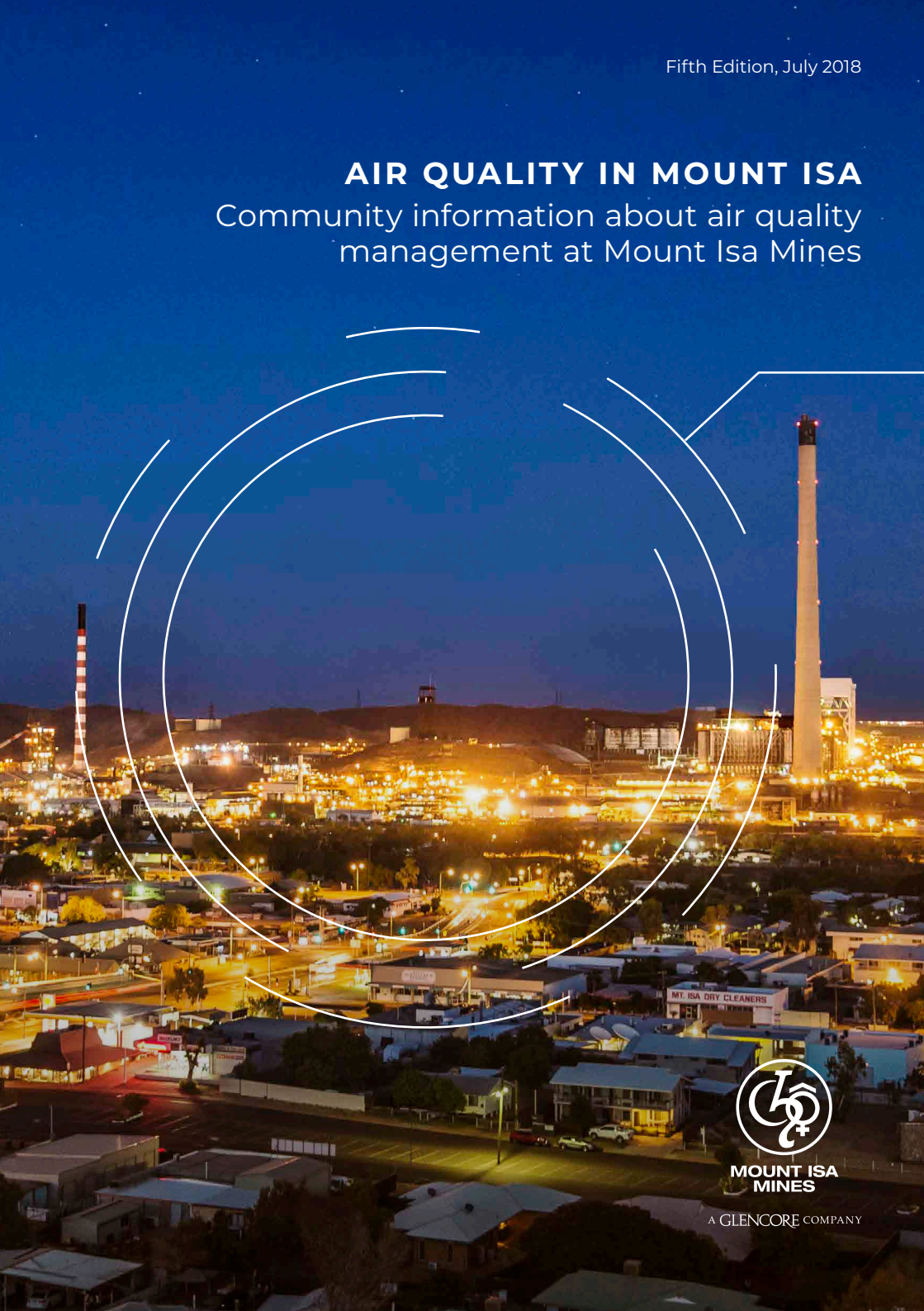


AIR QUALITY IN MOUNT ISA

Community information about air quality management at Mount Isa Mines



**MOUNT ISA
MINES**

A GLENORE COMPANY

Mount Isa is one of Australia's most successful mining towns, with a demonstrated coexistence between industry and community.

As modern regulations and accepted science evolve, so does Mount Isa Mines.

We operate on the doorstep of a thriving city of around 22,000 people and we work hard to minimise any impact to our local community.

Our people and their families live locally and call Mount Isa home so the wellbeing of the community and operating responsibly will always be our priority.



Air Quality in Mount Isa

Mount Isa is one of the most mineral-rich regions in the world. The natural, highly mineralised nature of the region is the reason Mount Isa has enjoyed such a long and rich mining history.

The copper and zinc-lead ores found in our region and mined and processed at Mount Isa Mines contain natural occurring sulphur and a range of minerals and metals such as lead, cadmium and arsenic.

When ore is processed, sulphur dioxide (SO₂) is released. Most of the copper smelter gases are captured and transferred to the Incitec Pivot Acid Plant, which treats the sulphur dioxide to produce sulphuric acid.

Metallic particulates can be released from our operations, through the transfer of dust

into the community and through emissions from our smelting operations.

We have stringent systems in place to manage emissions and dust generated by our operations to minimise impacts to the local Mount Isa community, as well as a comprehensive Air Quality Control Centre that uses real-time air quality data to monitor emissions and observe emerging weather patterns.

For more information on our management of air quality, refer to page 4 of this brochure.

Our obligations

Our operations are managed under the Queensland environmental regulatory regime.

In 2011, Mount Isa Mines transitioned to a new Environmental Authority in line with modern regulations, with further amendments in September 2015. Today, our 32,000 hectare mining lease is governed by over 80 separate permits and authorities, with stringent and transparent reporting of our environmental performance.

About sulphur dioxide

Sulphur dioxide (SO₂) is an odorous gas generated through natural and industrial processes. In nature it is a gas released by volcanoes or hot springs and is also produced when vegetation on land, in wetlands or oceans decay or break down.

In Australia, the largest source of sulphur dioxide in the air is from industrial processing or materials containing sulphur, such as the smelting of sulphide ores or electricity generation from coal, oil or gas. Sulphur dioxide is also present in emission from cars, buses and trucks as the result of fuel combustion. It is widely used to manufacture a number of household goods such as in wine making as an antibiotic and antioxidant, and added as a preservative in dried fruits because of its antimicrobial properties (preservative 220).

HEALTH EFFECTS OF SULPHUR DIOXIDE

Our senses easily detect sulphur dioxide at concentrations well below the level that may cause irritation or discomfort. At higher concentrations sulphur dioxide can irritate the throat, lungs, eyes, and to a lesser extent, skin. The effects of sulphur dioxide can be felt very quickly, with most people feeling the worst symptoms within 10 to 15 minutes after exposure.

If you experience respiratory discomfort from sulphur dioxide, please consult a medical professional.

Key air quality improvement initiatives:

- Significant improvements in emission capture
- Better identification of emission sources and procedures to control them
- Major advancements in how we respond to the release of emissions and their measured impacts, aligned with tighter environmental limits

Symptoms can include:

- Coughing, wheezing or shortness of breath
- Dry or irritated throat
- Watery, itchy eyes

When there are higher levels of sulphur dioxide in the air and a person feels they are being affected, they should limit their physical activity, particularly if outdoors as this increases the volume of air breathed in.

If possible move indoors and close windows and doors, and use air conditioning on recirculation mode until outside air quality improves.

Unless consistently exposed to very high concentrations, in most instances, exposure to sulphur dioxide does not cause long-term health impacts to people. Some people may be more sensitive than others to exposure to sulphur dioxide in the air.

Those with lung conditions such as asthma, chronic bronchitis or emphysema may find their conditions aggravated by sulphur dioxide.

About metals

The same minerals mined at Mount Isa Mines are the same as those that can be found outcropping throughout the city of Mount Isa. As such, there are both natural and industrial sources of mineralisation intermixed throughout Mount Isa.

The copper and zinc-lead ores mined and processed at Mount Isa Mines contain a range of naturally occurring minerals, including metals such as lead, cadmium and arsenic.

- **Lead** – A soft, malleable metal. At Mount Isa Mines, zinc-lead-silver ore is mined underground at George Fisher Mine and Lady Loretta Mine and processed, along with third party concentrate to produce lead concentrate and lead bullion.
- **Arsenic** – A grey crystalline mineral in its solid state, and also naturally occurring in water and some food in a dissolved organic form. It can be found in air or soil and is commonly associated with copper ore, its products and by-products.
- **Cadmium** – A soft, ductile, silver-white or blue-white metal found naturally in zinc sulphide based ores. It can be released through mining and smelting activities.

Metals including cadmium and lead, are common industrial emissions released mainly as a result of various industrial activities and can contribute to the deposition and build-up of these metals in soils.

Mount Isa Mines has comprehensive programs in place to minimise emissions generated by our activities for our workforce and the community. You can reduce your exposure risk by maintaining a clean home, good hygiene, and a healthy diet.

For more information on reducing your exposure to lead and other metals, the Lead Alliance can provide useful advice and a range of helpful resources. You can contact the Lead Alliance on 1800 457 547.

Over the past decade, Mount Isa Mines has achieved substantial reductions in the total emissions generated from our site, particularly across a number of metals and metalloids.

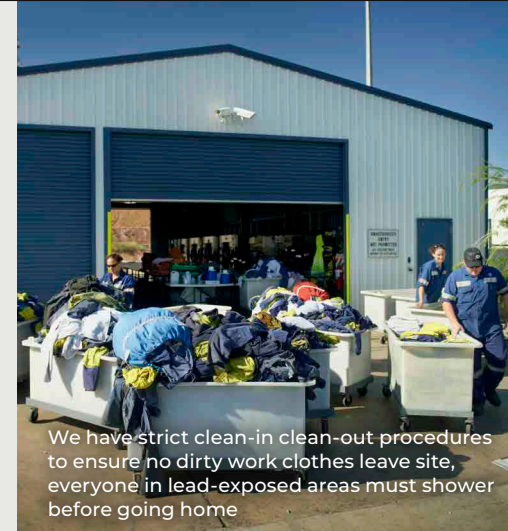
We have achieved this by significantly improving emission capture, better identifying emission sources and procedures to control them, and major advancements in how we respond to emissions released and their impacts.



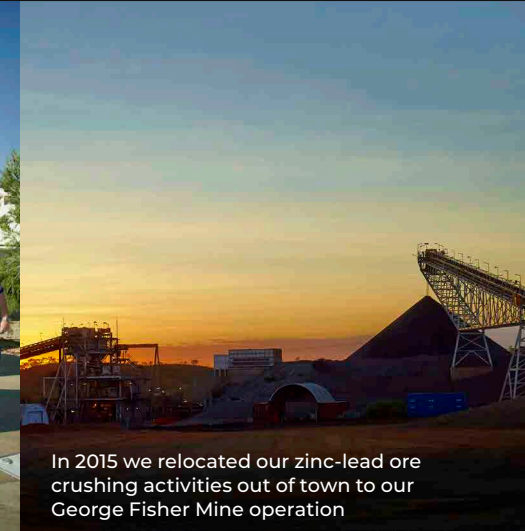
Our air quality management practises

As part of our Queensland Government approved Environmental Authority, Mount Isa Mines employs four management plans to **measure, manage** and **reduce** dust and emissions generated from our operations. These include:

MANAGEMENT PLAN	FOCUS AREA	KEY CONTROLS
Process Emissions Management Plan	Process generated dust and the ongoing review and implementation of controls	Ventilation and dust capture systems, enclosure of operations such as conveyors or sheds, wetting of materials, and mist or fog sprays to capture dust as it is emitted
Open Areas Management Plan	Wind driven dust from open areas on the Mount Isa Mines site	Dust suppression of stockpiles through watering and use of agents to bind surfaces. Onsite materials are contained in sheds and regular cleaning, wind breaks, stockpile covers and surface roughening is also employed
Road Hygiene Management Plan	Managing dust generated from vehicle movement	Vehicle wash down and tyre cleaning facilities, road cleaning equipment, on-road sampling, established containment zones to reduce silt trackage, covering vehicle roads, sealing of previously unsealed roads and vehicle speed restrictions
Air Quality Management Plan	Overarching plan to ensure compliance with the air quality requirements of our Environmental Authority	This plan promotes a continuous improvement process aimed at identifying significant dust hazards and establishing site specific best practice dust controls



We have strict clean-in clean-out procedures to ensure no dirty work clothes leave site, everyone in lead-exposed areas must shower before going home



In 2015 we relocated our zinc-lead ore crushing activities out of town to our George Fisher Mine operation

Key air quality improvement initiatives

Since 2003, we have invested in excess of \$500 million in environmental expenditure to significantly improve our environmental performance. This includes more than \$5 million directly invested into environmental air quality system improvements and management initiatives.

Over the years we have implemented industry-leading projects targeting air quality management and continue to improve our environmental performance and enhance what is already the most sophisticated air quality monitoring system of any Australian city.

Some of our key air quality improvement initiatives include:

- Ongoing enforcement of strict clean-in clean-out procedures and dedicated wash bays for vehicles, to stop material leaving site on people and equipment
- Established the ApportionIsa system to pinpoint sources of containments on site
- Installed 24/7 camera monitoring.

AIR QUALITY MANAGEMENT

- Major upgrade of our air quality monitoring network on site and within the community
- Installed two continuous metals monitor in the community, in addition to the Queensland Government Department of Science, Information Technology and Innovation monitor
- Implemented innovative dust forecast and alert system via atmospheric modelling
- Significant improvements in emissions capture and better identification of emission sources and procedures to control them
- Major advancements in how we respond to the release of emissions and their measured impacts, aligned with tighter environmental limits.

DUST MANAGEMENT

- Established lead concentrate containment facility
- Relocated over 40 per cent of ore crushing activities out of town to our George Fisher Mine operation
- Sealed eight kilometres of roads and established a road cleaning program



Our Air Quality Control Centre uses the most intensive air quality monitoring network of any city in Australia which operates 24/7 to minimise impacts to the community and comply with our strict regulatory limits

Air Quality Control Centre

Mount Isa has one of the most intensive air quality monitoring systems of any city in Australia.

Established in 1975, our Air Quality Control (AQC) Centre uses real-time air quality data to monitor sulphur dioxide emissions and observe emerging weather patterns.

AQC is independent to our smelter operations and works both predictively and reactively to minimise impacts to our community and ensure compliance with our regulatory limits. AQC provides daily forecasts and planning advice to our smelter operations and also monitors real-time air quality data and conditions at ground level to ensure smelter operations can respond appropriately to any unexpected weather events.

As part of our air quality monitoring system, we have two continuous metal monitors in the community which measure metals in air 24/7 to ensure we minimise any impact to the people of Mount Isa.

We monitor the concentration of metallic particulates in the air, including arsenic, cadmium, copper, lead and zinc, as well as an additional 19 metals, within the Mount Isa community using our comprehensive air quality monitoring system.

WIND DIRECTION IN MOUNT ISA

Throughout the year, Mount Isa receives the majority of wind from the east and south-east. This means for most of the year, the wind blows emissions and dust away from the Mount Isa township to the west, limiting impacts to the community.

During summer and spring, the occurrence of westerly winds (blowing emissions to the east) can increase the potential impacts to our community. During these months, AQC works closely with our smelter operations to ensure we continue to minimise the impact of our smelting activities on the community.

The windrose diagrams (right) show wind speed and direction on an annual and quarterly basis in Mount Isa. The arrow indicators show the direction from which the majority of wind blows. Note that between October and March, there are more instances of wind blowing from the west to the east.

What does Air Quality Control do?

- ✓ Analyse and predict weather conditions
- ✓ Provide advice to smelter operations
- ✓ Monitor real-time air quality data and conditions at ground level

How does that affect our smelter operations?

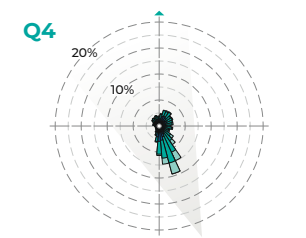
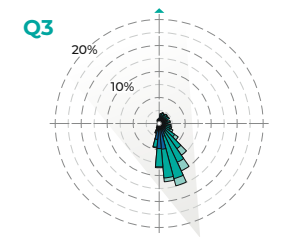
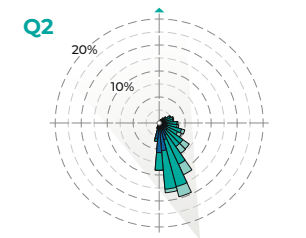
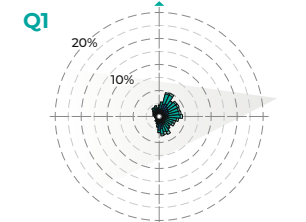
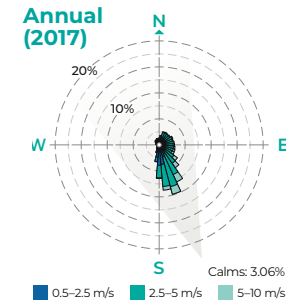
AQC collaborates with smelter operators and the Incitec Pivot Acid Plant to reduce emissions. This is achieved by reducing or shutting down smelter operations if emissions can't be managed within acceptable limits.

AQC alert process

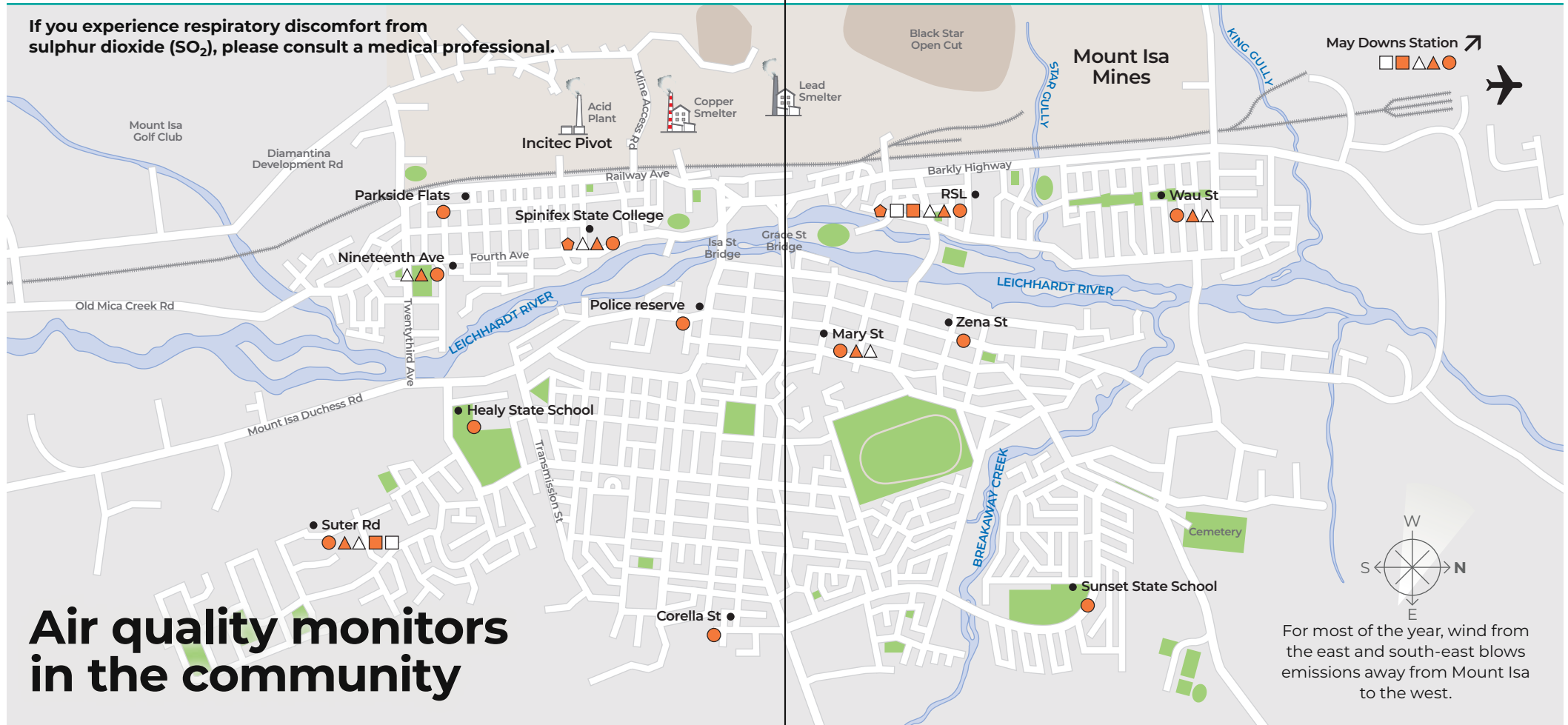
- ✓ **Unrestricted operations**
Weather conditions indicate no changes required to operations
- ➔ **Standby, pending restrictions**
Potential need to reduce operations or shut down to manage emissions due to pending change in weather conditions
- ✗ **Reduced operations**
Smelters must reduce operations to lower emissions and prepare to potentially facilitate an immediate shutdown
- ✗ **Shutdown**
Smelters must cease operations immediately as weather conditions show smelter operations may impact the town or are approaching regulatory limits

! In 2017, our Air Quality Control Centre restricted smelting operations via complete or partial shutdowns for a total of 2,489 hours, or more than 103 days to minimise community impact

Typical wind speed and direction



If you experience respiratory discomfort from sulphur dioxide (SO₂), please consult a medical professional.



Air quality monitors in the community

For most of the year, wind from the east and south-east blows emissions away from Mount Isa to the west.

The most comprehensive air quality monitoring system of any Australian city

13
monitoring stations

> 50
individual units

24/7
monitoring

Each resident is within approximately **1,200 m** of an air quality monitoring unit

Legend

- SO₂ Monitors

- High Volume Air Sampling monitors:
- ▲ PM₁₀*
- ▲ Total Suspended Particulates

- Dust monitors:
- PM₁₀*
- PM_{2.5}**
- ◆ Xact metals monitor

- Roads
- Railway

How many monitors in the network?

Real-time SO ₂ monitoring stations	13
Passive SO ₂ monitoring stations†	6
High Volume Air Sampling monitors	14
Continuous dust monitors*	6
Dust deposition gauges†*	7
Xact metals monitor	2

★ We have a number of monitors and gauges we can deploy at specific sites to monitor our performance and target improvements.

* Measures particulate matter 10 micrometres or less in diameter.
 ** Measures particulate matter 2.5 micrometres or less in diameter.
 † Not displayed on map.



Inside Air Quality Control

Our Air Quality Control (AQC) Centre employees are trained in meteorology to understand and predict weather specific to the Mount Isa region. Our people have extensive experience in understanding the interaction of weather patterns with our operations and across our community.

Our AQC employees are independent to our smelter operations and responsible for minimising air quality impacts to our local community and ensuring our environmental obligations are met.

AQC operates seven days a week, with extended and overnight coverage, to manage unfavourable weather conditions and potential community impacts.

WHAT DOES AQC DO?

- Analyse weather forecasts
- Predict air quality conditions at ground level
- Provide our operations with daily reports on weather predictions and likely impacts
- Monitor our comprehensive network of sulphur dioxide monitors and meteorological stations
- Provide ongoing advice to smelter operations on real-time weather conditions and air quality data.

AQC collaborates with smelter operations and the Incitec Pivot Acid Plant via an internal alert system that advises of any potential requirements to reduce or stop production when emissions cannot otherwise be managed within acceptable limits.

UNPREDICTED CHANGES TO AIR QUALITY

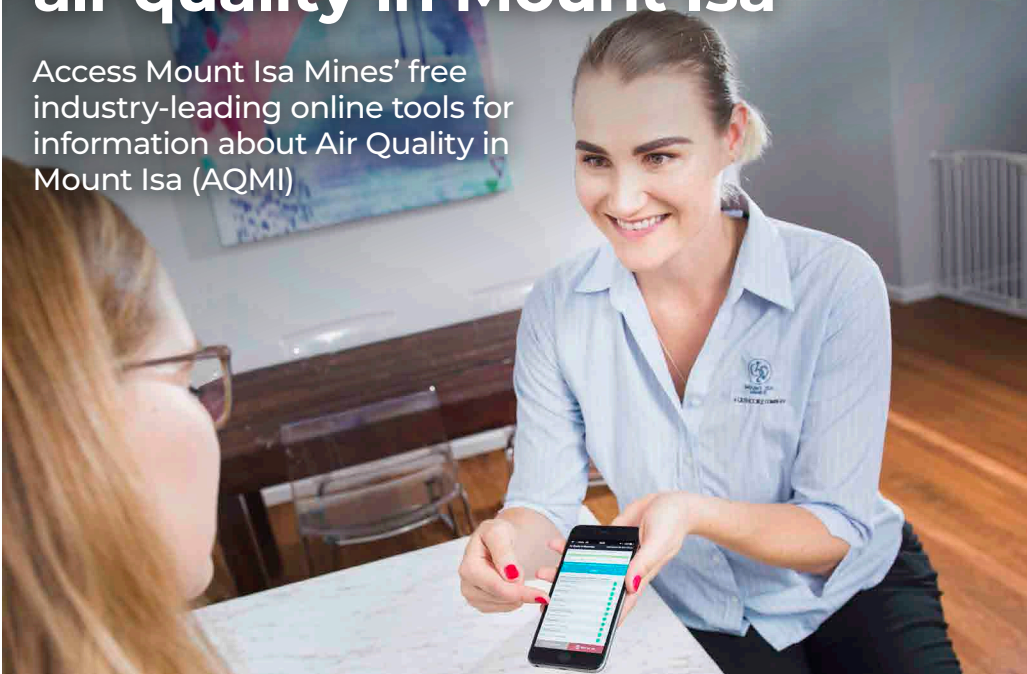
At times, weather conditions can change rapidly from our forecasts to create unanticipated impacts to air quality within our community. This may increase short-term exposure to sulphur dioxide and lead to temporary discomfort for some members of the community. Through our monitoring systems, we aim to react to these situations as quickly as possible, advise smelting operations of the changes and implement the AQC alert process to minimise impacts as much as we can.

If you are being impacted by exposure to sulphur dioxide, move indoors if possible and report the issue to the Mount Isa Mines 24-hour Community Feedback Hotline by phoning 1800 982 982.

In most instances, you will notice a significant improvement in air quality within 30 minutes as we respond to the situation.

Real-time information on air quality in Mount Isa

Access Mount Isa Mines' free industry-leading online tools for information about Air Quality in Mount Isa (AQMI)



AQMI SMARTPHONE APP

Information at your finger tips

- See the 24 hour forecast for westerly wind conditions and probability of restricted operations to manage sulphur dioxide emissions
- See what the air quality in your suburb is like and receive notification when a suburb has an increased likelihood of sulphur dioxide emissions.

Download the free app from the [Apple App Store](#) or [Google Play](#), just search for AQMI.

AQMI ONLINE PORTAL

Information in depth

- Detailed information about our air quality management practices, procedures and improvement initiatives, as well as a breakdown of our State Government regulated compliance obligations
- Hourly, daily-average and annual-average air quality performance results direct from Mount Isa Mines' sophisticated air quality monitoring network
- Useful information about sulphur dioxide and health.

Go to www.mountisamines.com.au, then click on the AQMI Portal link.

For more information, contact the Mount Isa Mines' Community Feedback Hotline on 1800 982 982 or visit www.mountisamines.com.au

Keeping in touch with our community



**MOUNT ISA
MINES**

A GLENCORE COMPANY

Where can I find out more?

Contact us

Call our Community Feedback Hotline on 1800 982 982

Our dedicated Community Relations team is responsible for engaging openly and honestly with our stakeholders, as well as responding to all community enquiries and complaints.

You are encouraged to contact the 24-hour hotline if you have any questions, concerns or believe there is an increase in sulphur dioxide in your area.

Visit our online Air Quality Web Portal at

www.mountisamines.com.au for the latest on our air quality improvement initiatives and hourly air quality results updates from our monitoring network.

Write to us at

Community Relations Team
Mount Isa Mines
Private Mail Bag 6
Mount Isa Qld 4825

If you experience respiratory discomfort from sulphur dioxide emissions, please consult a medical professional.

Other resources

Lead Alliance

1800 457 547
www.leadalliance.com.au

QML Pathology Mount Isa

Free blood-lead testing is available to all Mount Isa residents
13a Isa Street, Mount Isa
(07) 4743 4299

Department of Environment and Heritage Protection

We provide information from our air monitoring stations to the Queensland Department of Environment and Heritage Protection. For more information on air quality monitoring in Mount Isa, visit www.ehp.qld.gov.au

Australian Government Department of the Environment and Energy

Fact sheets – www.environment.gov.au (search 'sulphur dioxide' and 'lead')

Queensland Health hotline

13 HEALTH (13 43 25 84)



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MINES**

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JULY 2018

www.mountisamines.com.au

 [@GlencoreAus](https://twitter.com/GlencoreAus)

 facebook.com/GlencoreAus

Community Feedback Hotline
1800 982 982

Mount Isa Mines Limited
ABN 87 009 661 447

Write to us at
Mount Isa Mines, Central Office
Community Relations Team
Private Mail Bag 6
Mount Isa Qld 4825

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