INFORMATION SHEET

AIR QUALITY

FACTORS AFFECTING AIR QUALITY

Local industry, households and the climate of our region all influence the quality of the air around Kalgoorlie-Boulder.

There are a number of sources that contribute to local air quality including mining emissions, from both gold roasting and nickel smelting, cars, planes, and households, particularly in winter from wood heaters[1]. The dry and windy semi-arid desert environment can also result in very dusty conditions.

National and international air quality standards have been set with the goal to protect human health and well-being. Mining companies manage and monitor their activities to meet these standards. Routine reports on performance are provided to regulatory agencies.

One of the most visible sources influencing Kalgoorlie-Boulder air quality is the Gidji Roaster operated by KCGM. This information sheet aims to answer some of the common questions people have regarding emissions from the Gidji Roaster.

GOLD ROASTING IN KALGOORLIE-BOULDER

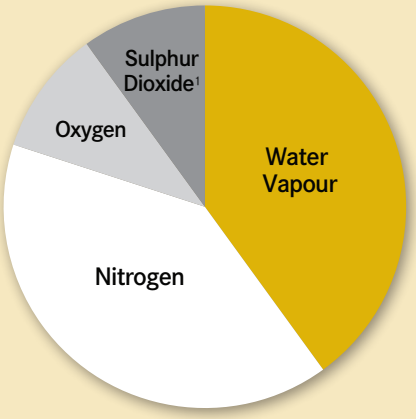
Roasting has been occurring in the Goldfields since 1898. Most of the gold along the Golden Mile is intricately bound in various sulphide minerals such as pyrite and roasting is still the most effective method to maximise gold recovery.

The Gidji Roaster was constructed in 1989 and processes the sulphide concentrate produced by the Fimiston Mill. The concentrate is treated in one of two roaster beds and produces off-gases which are emitted through a 180 metre high stack. The Gidji Roaster location and stack height were determined to be the best for air quality control based on studies done for the Environmental Protection Authority.

WHAT IS IN THE GIDJI ROASTER PLUME?

Roaster emissions (also known as off-gases) are predominantly made up of Nitrogen (40%), water vapour (H_2O) (40%), Oxygen (10%), and Other Compounds (10%). Other compounds calculated for the National Pollutant Inventory show that 9.996% is SO_2 and 0.003% is particulate material. There are also a number of other substances in the plume including arsenic and mercury. While present in low concentrations (when compared to SO_2), some of these substances may still impact on human health and require management. All Gidji Roaster emissions are managed by an Air Quality Control Strategy (AQCS).

GIDJI PLUME CONTENTS



- Water Vapour (H_2O)
- Nitrogen
- Oxygen
- Sulphur Dioxide[1] (9.996% SO_2, 0.003% particulates, arsenic & mercury)

WHY DOES THE PLUME APPEAR DIFFERENT FROM TIME TO TIME?

While the actual composition of the plume does not significantly change, plume visibility often varies due to atmospheric conditions. Wind strength, temperature and the presence of cloud can all influence how the plume looks at any given time. Even the angle of the sun can change how the plume apppears as the particles and gases in the plume reflect and absorb light.

KCGM is continually working towards improving local air quality, and changes to the roasting process can also result in the plume looking different. In 2004 KCGM changed its roaster conditions adding more oxygen to reduce arsenic emissions. This change caused the plume to be more visible giving it the distinct white cloud-like appearance.

At other times during maintenance or for air quality control the roasters may be shutdown or operate at reduced tonnes and the plume may not be visible at all.

HOW ARE AIR EMISSIONS FROM THE GIDJI ROASTER MANAGED TO PROTECT HUMAN HEALTH?

The Gidji Roaster is operated in accordance with a strict AQCS to ensure that air quality standards for SO_2, mercury, arsenic and particulates are met for the protection of human health. Standards are regulated by the Environmental Protection (Goldfields Residential Areas) (Sulphur Dioxide) Policy (EPP)[2] and licence conditions issued under the Environmental Protection Act (1986).

KCGM's AQCS includes constant monitoring of wind and atmospheric conditions in Kalgoorlie-Boulder and surrounding areas. At any time of the day or night, KCGM's team of trained professionals are available to respond to AQC issues, including shutting down the Gidji Roaster to minimise impacts on local residents. In general, roasting stops for approximately 23% of the time in accordance with KCGM's AQCS.

DO GIDJI ROASTER EMISSIONS AFFECT THE SURROUNDING VEGETATION?

A monitoring programme was established in 1989 to identify any impact to vegetation from emissions from the Gidji Roaster. In 2011, a comprehensive statistical analysis of the data was undertaken and in general, the data provides no evidence of a negative impact on plant condition due to Gidji Roaster emissions.

HOW ARE AIR EMISSIONS FROM THE GIDJI ROASTER MONITORED?

KCGM maintains an extensive SO_2 monitoring network on behalf of the Kalgoorlie Air Monitoring Network (KAMN) within the EPP areas of Kalgoorlie-Boulder, Coolgardie, Kurrawang and Kambalda. There are 10 real time SO_2 monitors in the network which provide data every 5 minutes. During 2011, there were no events recorded above the standard or limit in EPP areas. On advice from government agencies, KCGM is undertaking further SO_2 monitoring to the north of Gidji Roaster outside the EPP areas.

Air dispersion modelling of mercury emissions has been undertaken. The levels being emitted from KCGM pose no risk to workers or the community and are well below World Health Organisation standards. KCGM completed short term mercury and nickel ambient air monitoring during 2011 and the results were consistent with the modelled levels. KCGM is undertaking further ambient mercury monitoring on advice from government agencies.

Routine testing is also undertaken for particulates and arsenic from the Gidji Roaster stack and during 2011 emissions were managed within licence conditions. Monitoring data is reported to government agencies monthly, quarterly or annually.

WHAT IS KCGM DOING TO REDUCE AIR EMISSIONS?

SO_2 levels in residential areas have decreased considerably since the formation of KCGM in 1989. The decommissioning of three in-town roasters and the establishment of the Gidji Roaster to the north of the City has vastly improved air quality for residents.

Changing standards in the EPP have also resulted in a more stringent AQCS with shutdowns of the Gidji Roaster increasing from around 6% of the time in the 1990's to around 23% of the time. KCGM reviews any conditions associated with unexpected SO_2 levels, and refines its AQCS to minimise the likelihood of a recurrence of such an event in similar conditions.

Investigations into alternative technologies also continue. KCGM uses Ultra Fine Grinding (UFG) Mills at Gidji and Fimiston to treat surplus concentrate which cannot be processed at the Gidji Roaster due to the tightened AQCS.

FURTHER INFORMATION

Information on KCGM's air quality management is available by contacting the KCGM Public Interaction Line on 9022 1100 (available 24hrs a day, seven days a week), or visiting the website www.superpit.com.au.

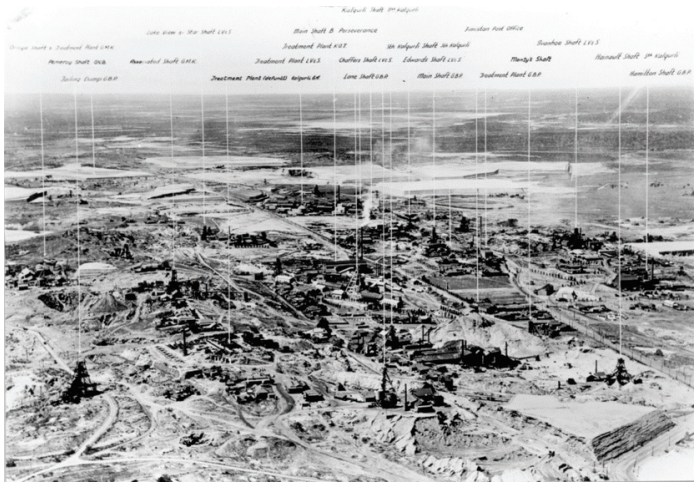


Figure 1: The Golden Mile in 1950 was arid, deforested and populated with headframes and roaster stacks, resulting in poor air quality and dusty conditions

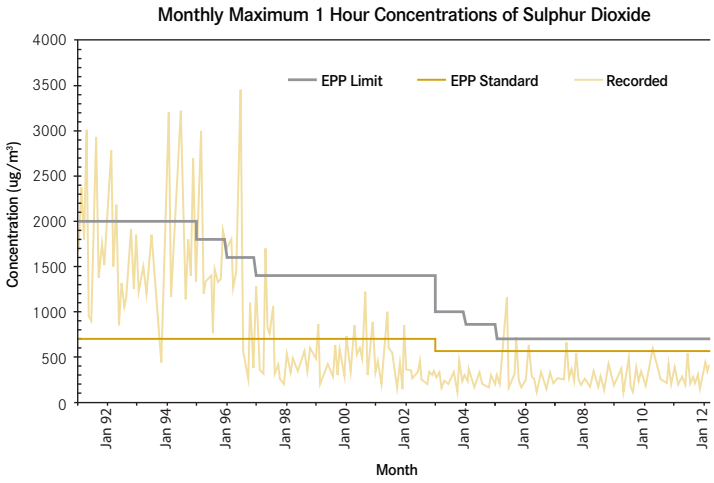


Figure 2: Progressive tightening of Air Quality Standards and limits reflect the vast improvement in air quality in Kalgoorlie Boulder.