

# KCGM

## NEWS & VIEWS

Issue 7 February 2009

OUR NEWS *Your Views*

### From the General Manager Russell Cole



Welcome to the seventh edition of News & Views. KCGM produces News & Views to inform the community about KCGM operational issues and to respond to feedback provided by you through our consultation programs such as our 24hr Public Interaction Line and queries coming through the Super Pit Shop.

We often have enquiries relating to the visible plume that comes from the Gidji Roaster, located 20kms to the north of Kalgoorlie-Boulder, to ask us what's in it and how do we manage it?

So in this edition of News and Views, we will take a look at the workings and management of the Roaster which is an essential part of processing gold at KCGM.

Read on to find out more.

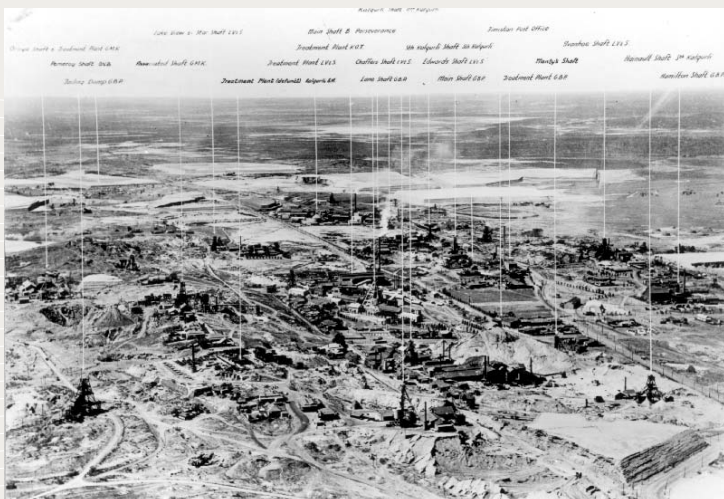
Russell Cole  
General Manager, KCGM



## >> History of roasting in Kalgoorlie-Boulder

Mining and the town have always existed in close proximity to one another and roasting has been occurring in Kalgoorlie-Boulder since 1898.

Miners working along the Golden Mile had very few transport options available to them so they lived and worked on their leases. The obvious lack of transport meant that they had to find an efficient and economical means of processing their gold, so the majority of them established their own mineral processing and roasting facilities on their individual leases.



By the early 1900's there were a total of 88 roasting facilities in operation along the Golden Mile.

A large proportion of gold ore in the Golden Mile is refractory in nature. This means that the gold is intricately bound in various sulphide minerals, such as pyrite and tellurides, making the gold difficult to extract. For this ore type, roasting has proven to be the most effective method to maximise gold recovery.

In 1989 a number of operations on the Golden Mile were consolidated to form Kalgoorlie Consolidated Gold Mines Pty Ltd (KCGM). With the formation of KCGM came the development of large scale open cut mining and an expansion of milling (Fimiston Mill) and additional roasting capacity.

Part of the advantage of bringing all the operations along the Golden Mile together under KCGM was the opportunity for a phased reduction of in town roasting through the decommissioning of the remaining three roasters and the establishment of a central roasting facility, Gidji, located 20kms north of the City.

### MORE INFORMATION

#### How do I give feedback to KCGM?

The Public Interaction line, Ph 9022 1100 is available 24 hours a day, seven days a week for all queries regarding our operations. You can also drop into the Super Pit Shop at 2 Burt Street Boulder to talk with our Community Relations team.



**Roasting at Gidji**

The Gidji Roaster is designed for the roasting of refractory sulphide concentrate produced by the Fimiston Mill. The sulphide concentrate is treated in either of two re-circulating fluid bed roasters that can be operated separately and run at 650°C. The off-gases from each combine and exit through a single stack. During roaster operation the temperature is maintained by the heat generated from the exothermic reaction of the concentrate.

Roasting oxidises the sulphide particles (pyrite) to iron oxide(s), making them porous so that the gold can be removed. The iron oxide product from roasting (referred to as calcine) is then treated by a carbon-in-pulp circuit which leaches the gold from the calcine via conventional leaching methods. At this stage the gold is dissolved into the solution, coarse granulated carbon is then added which absorbs the gold (see flow chart page 4). The carbon with the gold attached is then captured for further processing.

**What is in the Gidji plume?**

As a result of the roasting process, emissions are released through the Gidji stack. Those emissions are called "off-gases" and are predominantly made up of nitrogen, oxygen, water vapour (H<sub>2</sub>O) and sulphur dioxide (SO<sub>2</sub>)

**Did you know?**

**Gidji Operation facts:**

- The Gidji stack is approximately 180m tall.
- The roaster is operated at 650°C, so much heat is generated that this temperature has to be controlled by the addition of cooling water.
- Approximately 4,000 hours of roasting are lost each year due to AQCS restrictions for certain atmospheric conditions.
- The concentrate is self combusting, once the right temperature is reached the concentrate ignites and continues to burn due to a heat generating chemical reaction inside the roaster.
- Gidji employs 33 local people as well as additional contractors.

**How does KCGM manage Gidji air emissions?**

The chief control of air pollution in Western Australia is the Environmental Protection Act 1986, which is administered by the Department of Environment and Conservation (DEC) and contains general controls on activities causing pollution and other forms of environmental harm.

Under the Environmental Protection Act, premises likely to cause pollution to the environment are identified as "prescribed premises" and are only permitted to operate under a licence or approval granted by the Minister for the Environment. The Gidji Roaster is a "prescribed premises", and is operated under such a licence subject to strict controls with regard to air emissions. The conditions of the licence require compliance with the provisions of the Environmental Protection (Goldfields Residential Areas) (Sulphur Dioxide) Policy 2003 (EPP).

The purpose of this policy is to specify the maximum SO<sub>2</sub> concentration permitted in the ambient air of the protected area and also to control and progressively reduce the SO<sub>2</sub> concentration of ambient air in those protected areas.

Local SO<sub>2</sub> emitters are required to monitor and manage the SO<sub>2</sub> emissions in accordance with this policy and their licence conditions.

In order to manage Gidji SO<sub>2</sub> emissions in the EPP area, KCGM has developed an Air Quality Control Strategy (AQCS).

The AQCS uses prevailing and predicted weather conditions and an extensive SO<sub>2</sub> monitoring system to ensure roasting operations adhere to the air quality requirements of the EPP.

Together with data from the Bureau of Meteorology the AQCS uses data collected from KCGM's sophisticated weather monitoring network to determine wind and atmospheric conditions at various heights in the atmosphere. This data in combination with data from the extensive SO<sub>2</sub> monitoring network, located within the protection areas, ensures the Gidji Roaster operates in accordance with the strategy. The strategy will limit or even stop production as determined by the prevailing conditions.

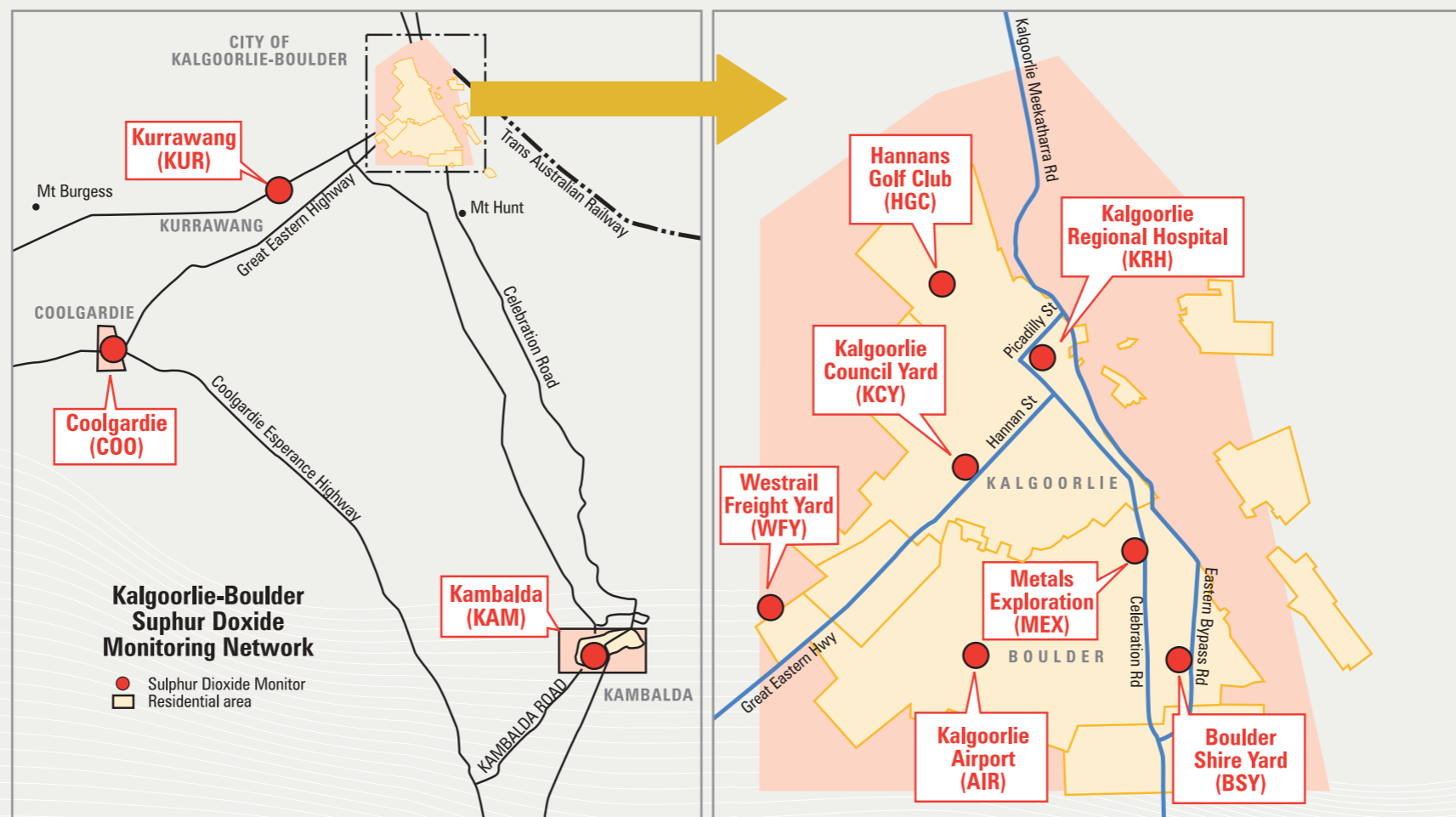
The SO<sub>2</sub> monitoring network comprises of ten continuous ambient SO<sub>2</sub> monitoring stations, seven of which are located in Kalgoorlie-Boulder. The other stations are located at Coolgardie, Kurrawang and Kambalda (see map below). KCGM's Environment Department has a team of trained On Call Advisors, who are readily available to provide assistance to the Gidji Roaster personnel on AQCS management.

KCGM is dedicated to protecting the local air quality through the appropriate operation and management of the Gidji Roaster.

We are also committed to meeting stricter targets on our emissions to ensure that Kalgoorlie-Boulder continues to enjoy a safe environment.

**What is the KAMN?**

KAMN stands for the Kalgoorlie Air Monitoring Network and it is a co-operative arrangement between local SO<sub>2</sub> emitters. The current members are BHP Kalgoorlie Nickel Smelter, Barrick Kanowna and KCGM. Members of the Environmental Departments from each of these companies meet quarterly to discuss air quality matters. The KAMN is committed to protecting the air quality of Kalgoorlie-Boulder and surrounding areas.



**Location of SO<sub>2</sub> Monitoring Sites**

SO<sub>2</sub> data are recorded every 2 seconds and averaged every 5 minutes

**Did you know?**

**Sulphur dioxide facts:**

- SO<sub>2</sub> can be emitted from fossil fuel power plants, wood pulping and paper manufacturing processes, decaying vegetation and volcanic activity.
- SO<sub>2</sub> is used as a fruit preserving agent and as a food preservative or additive.
- It is used in the fermentation stage of wine making, for bleaching textile fibres, in the manufacture of paper, as a disinfectant in breweries and food factories, and as a fumigant for grains, grapes and citrus fruits.
- SO<sub>2</sub> is a common substance to which we are exposed at very low levels every day by breathing air in cities, with vehicle exhaust being a significant source of SO<sub>2</sub>.

**What is the Environmental Protection (Goldfields Residential Areas) (Sulphur Dioxide) Policy 2003?**

The Environmental Protection (Goldfields Residential Areas) (Sulphur Dioxide) Policy 2003 (EPP), was first introduced in 1987. It specifies the areas which the EPP protects and states the maximum ambient SO<sub>2</sub> concentrations allowed in those areas. The maximum limit is 0.25ppm over one hour, which is never to be exceeded.

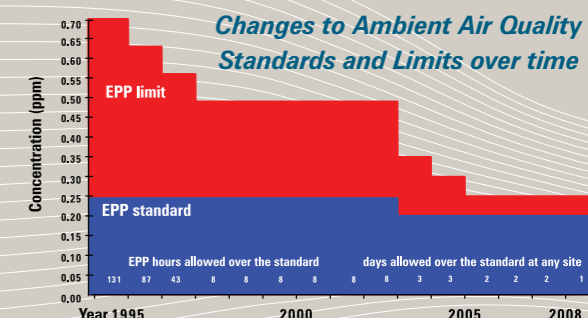
The EPP also specifies a "desirable" ambient air quality standard for SO<sub>2</sub> of 0.2ppm over one hour, which is not to be exceeded more than one day a year at any monitoring site. The EPP concentration standard in place aligns with the National Environmental Protection Measure Standard (NEPM) of 0.20ppm for one hour. The EPP has been reviewed numerous times over the past several years, most recently in 2003, with a continuous progressive tightening of the limit and standard (see graph below).

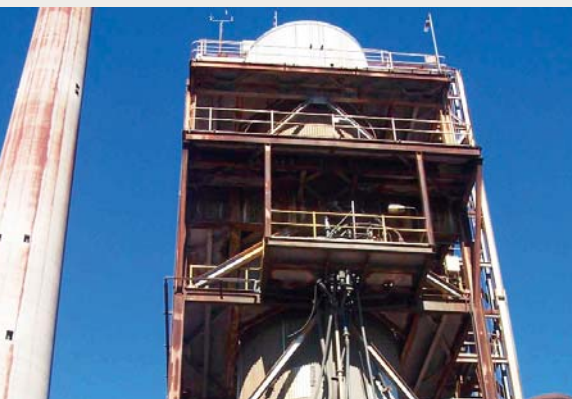
The EPP is regulated via environmental licence conditions, issued under the Environmental Protection Act (1986). KCGM adheres to stringent regulatory licence conditions for its operations, this involves monitoring and reporting quarterly emissions from the Gidji Roaster. While also reporting on ambient air data in the EPP area on a monthly basis.

**Is there an impact on vegetation?**

The ambient SO<sub>2</sub> concentration is also monitored in the vicinity of the roaster to assist with the monitoring of potential impacts of SO<sub>2</sub> to vegetation with results from monitoring reported to government annually. To date monitoring has indicated that SO<sub>2</sub> has no adverse effect on local vegetation.

**Changes to Ambient Air Quality Standards and Limits over time**





**GOT AN ISSUE WITH KCGM?  
WANT TO GET IT ON THE  
AGENDA?**

Want to get it on the Agenda? If you would like to discuss an issue you have with KCGM, you can contact one of our CRG members and have it discussed at a Community Reference Group Meeting.

- Anne Petz (08) 9093-3938
- Deborah Botica (08) 9021-8535
- Guy Brownlee (08) 9021-6522
- Jeff Jones (08) 9021-5633
- Kathleen Bentley (08) 9022-7501
- Kevin Smallhorn (08) 9021-2420
- Murray Joyce (08) 9021-4262
- Max Bentley (08) 9091-2467
- Natalie Dowd (08) 9021-7437
- Morrie Goodz (08) 9022-7725
- Tony Stephenson (08) 9093-5648

**>> Commonly asked questions**

**Why does the Gidji plume sometimes appear brown?**

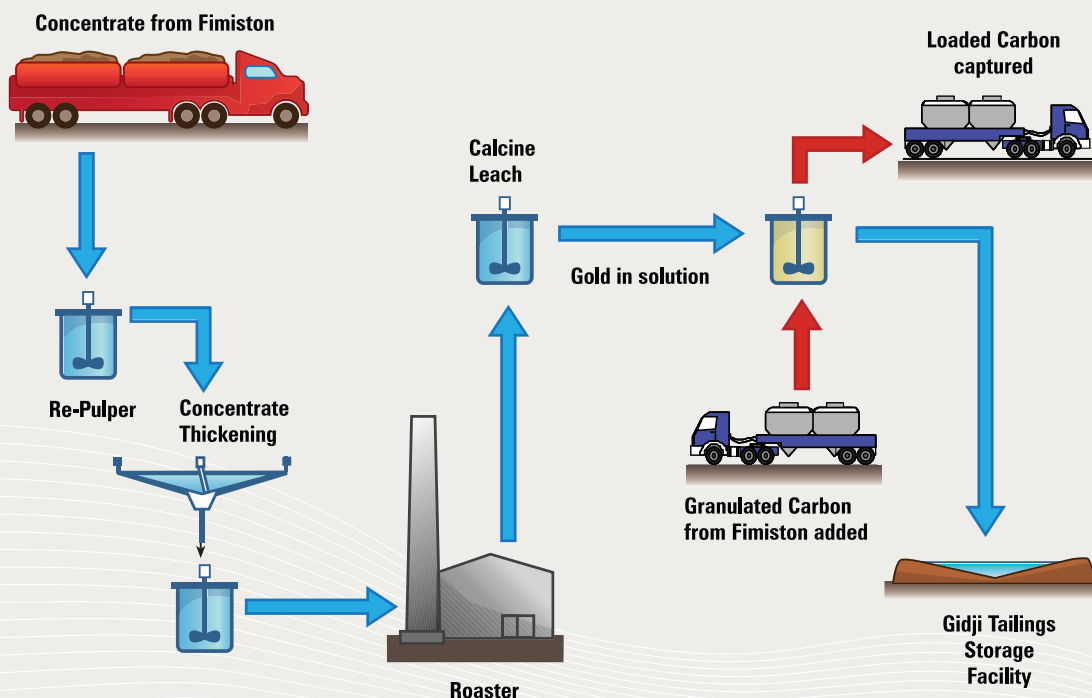
The typical composition of the Gidji plume does not change however it can appear darker under particular atmospheric conditions. Wind strength, plume dispersion, atmospheric temperature and the presence of cloud can all contribute to colour perception. Sun angle is also an important variable. Particles and gases in the plume scatter, reflect and absorb light, resulting in an apparent brown colour.

**Can the Gidji plume come toward town?**

Compliance with the EPP requires a constant monitoring of the wind and atmospheric conditions in Kalgoorlie-Boulder and surrounding areas. In order to protect the local air quality, roasting is generally restricted when the winds are blowing from a northerly direction towards town, and it is only in certain circumstances that restricted roasting can occur. In fact, roasting stops for approximately 4,000 hours each year in certain atmospheric conditions due to KCGM's AQCS aimed at protecting the residents of the EPP area.



**>> Gidji Operation Process Flow Chart**



*The above diagram depicts the Gidji Operation Process*

If you have missed out on previous issues of News & Views and would like a copy, please contact our CR Office on 9093 3488 or visit the team at the Super Pit Shop, 2 Burt Street Boulder. It's also available online at [www.superpit.com.au](http://www.superpit.com.au)

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