19 July 2005

KCGM
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Mr Paul Rosair
Department of Environment
PO Box 6740, Hay Street
East Perth WA 6892

Dear Paul

Firstly thank you for meeting with myself and representatives from KCGM on 13th July. At this meeting we informed you of the results of recent testwork carried out to better understand possible levels of mercury emissions across our operation. Following from that meeting, as agreed, we have attached the results of our testing and air dispersion modelling.

Further, you requested that we assess whether any immediate measures could be taken to reduce possible emissions while we continue testwork to better understand the emissions. The information we have at the moment would indicate that mercury concentrations levels are below international health guidelines. These results, together with legal advice, indicate to us that it is not likely that either pollution or material or serious environmental harm has resulted and, hence, section 72 has not been triggered. Nevertheless, we have reviewed possible actions we could take.

The emissions from the Gidji Roaster are already managed by way of our agreed Air Quality Control strategies. To this end we have focussed on the Fimiston Carbon Kilns, being the source closest to Kalgoorlie Boulder. We are in the process of designing a scrubbing system that would reduce emissions from this source and would expect to have completed construction by the end of 2005. However, in response to your request we would propose to develop and implement an Air Quality Control system, similar to that used for the Gidji roaster, for the operation of these Kilns.

This above described approach is consistent with KCGM's desire to take a responsible and transparent approach to this issue and to inform and work closely with the Department in developing a management strategy. We will keep you informed and continue to work closely with the Department.

Yours faithfully
KALGOORLIE CONSOLIDATED GOLD MINES PTY LTD

COBB JOHNSTONE
GENERAL MANAGER

cc: Wayne Astill (Kalgoorlie)
Ross Sheridan (Perth)

KCGM Gidji Roaster and Fimiston Carbon Kiln Stack Testing and Modelling Summary

As requested, information is provided on stack testing for mercury for the Gidji Roaster and Fimiston Carbon Kilns. Modelling estimates for both emission sources are also detailed.

Gidji Roaster

Testing of the Gidji stack emissions was undertaken during April 2005 to measure the concentration of mercury. The stack testing program was completed by Environmental Consultancy Services (ECS) using a modified version of the USEPA Method 29 procedure. The method was varied to accommodate the specific temperature, SO_2 and moisture levels in the Gidji stack emissions by using USEPA Method 17 (in-stack filters) rather than USEPA Method 5 (external filters) for isokinetic sampling of particulates. USEPA Method 17 is the method specified in KCGM's Gidji licence for the measurement of particulate during compliance testing and is considered to be an appropriate substitute to Method 5.

Additionally, due to the high SO_2 concentrations in the Gidji emissions, Method 29 needed to be modified to increase the concentration and quantity of the hydrogen peroxide (to 30%) used in the absorber solutions to ensure that they had sufficient capacity to oxidise the SO_2 and mercury. The results of the stack testing programme are summarised in Table 1.

Table 1
Summary of Gidji Roaster Stack Test Results

Run No.	Mercury		Comments	Valid/Invalid
	Concentration (mg/dscm)	Emission Rate (kg/hr)		
1	1.0	0.069	Absorbing solutions made up as per Method 29. The mass of sulphur dioxide sampled was likely to have exceeded the absorber capacity relatively early in the run.	Invalid
2	8.5	1.06	30% H_2O_2 used in first three impingers. Two roasters operational. One hour test run. The result from this run is considered to be representative.	Valid
3	9.0	1.13	30% H_2O_2 used in first three impingers. Two roasters operational. One hour test. run. The result from this run is considered to be representative.	Valid
4	8.3	1.05	30% H_2O_2 used in first three impingers. Two roasters operational. One hour test run. The result from this run is considered to be representative.	Valid
5	6.1	0.48	Only one roaster operational. Test conducted over 30-minutes and very small sample volume.	Invalid
6	6.2	0.46	Only one roaster operational. Test conducted over 30-minutes and very small sample volume.	Invalid

Note: mg/dscm is milligrams per dry standard (ie. 0°C, 1013.25 hPa) cubic meter.

As indicated in Table 1, runs 2, 3 and 4 are considered to be valid. The average mercury concentration in the emissions for these three runs was 8.6 mg/dcsm with an associated average emission rate of 1.08 kg/hr. On an annualised basis this equates to a mercury emission rate of approximately 7.1 tpa assuming that the Gidji roaster is operating for 75% of the year and the amount of mercury in the concentrate remains consistent.

ENVIRON has undertaken a screening assessment of the mercury emissions from the Gidji Roaster to predict the potential ground level concentrations on the northern end of Kalgoorlie. The modelling has been completed using the USEPA's Industrial Source Complex – Short Term Version 3 (ISCST3) air dispersion model.

The air dispersion modelling was calculated assuming 80ppm of mercury in the concentrate and the maximum feed rate to the two roasters. Recent concentrate assays indicate an average concentration of 22.8ppm. Ground level concentrations predicted by the modelling are therefore likely to be highly conservative. The calculated annual average ground level concentration of mercury based on these assumptions in Kalgoorlie is 0.001µg/m^3. The short term 1-hour average calculated value is 0.3µg/m^3.

The modelling has also been conducted assuming that the roasters operate continuously and that the KCGM Air Quality Control Strategy (AQCS) is not in use. Again this is a highly conservative assumption and is expected to result in an over prediction of the ground level concentration as the AQCS allows a maximum of only one roaster to be operated when the winds are blowing towards Kalgoorlie. The modelling has been undertaken assuming that the mercury emissions, which are mostly in a gaseous form, behave as a passive, non-reactive contaminant.

KCGM intends to review the option for further detailed air dispersion modelling using either TAPM or Calpuff once a better understanding of the mercury emission characteristics from the Gidji roaster is obtained.

Carbon Kiln

Stack testing of the Fimiston Carbon Kiln mercury emissions was undertaken in late 2004 as part of an industrial hygiene programme. The stack testing program was completed by ECS and the mercury concentrations were determined via a modified version of the USEPA Method 29 procedure. The modification to Method 29 made by ECS was the use of USEPA Method 17 (in-stack filters) rather than USEPA Method 5 (external filters) for isokinetic sampling of particulates. USEPA Method 17 was used for consistency of sampling method across KCGM activities. Results are accurate although there are no stack conditions for the Carbon Kiln preventing the use of USEPA Method 5. The results of the programme are summarised in Table 2.

Table 2
Summary of Fimiston Carbon Kiln Stack Test Results

Kiln	Run No.	Mercury	
		Concentration (mg/dscm)	Emission Rate (kg/hr)
Carbon Kiln 3 Mt Charlotte feed	1	45	0.06
	2	66	0.09
Carbon Kiln 4 Fimiston feed	1	12	0.01
	2	24	0.03

Note: mg/dscm is milligrams per dry standard (ie. 0°C, 1013.25 hPa) cubic meter

The results from the Carbon Kiln testing indicates that there is significant variation in the mercury emissions as the emission rate is intrinsically related to the quantity of mercury in the carbon which is in turn related to the quantity of mercury in the associated process circuit. Using the average of the four emission tests and an average operational time of 90%, the annualised mercury emission rate is approximately 0.38 tpa.

ENVIRON has undertaken a preliminary screening assessment of the mercury emissions from the Carbon Kilns to predict the potential ground level concentrations of mercury along the eastern edge of Kalgoorlie. The modelling has been completed using the USEPA's Industrial Source Complex – Short Term Version 3 (ISCST3) air dispersion model.

The maximum predicted annual average concentration of mercury in Kalgoorlie resulting from the Carbon Kiln emissions is 0.016µg/m^3. The short term 1-hour average calculated value for the Carbon Kiln emissions is 1.5µg/m^3.

The air dispersion modelling for the Carbon Kiln was calculated assuming 195ppm of mercury on the carbon feed and a maximum feed rate to the two kilns. Recent carbon assays indicate an average concentration of mercury on carbon of 88.2ppm. The modelling also assumes 100% of mercury is released from the carbon. However, carbon assays indicate about 93.5% of mercury is in fact released from the carbon. Ground level concentrations predicted by the modelling are therefore likely to be conservative.