KALGOORLIE CONSOLIDATED GOLD MINES PTY LTD REVISED NOISE AND VIBRATION MONITORING AND MANAGEMENT PROGRAMME JUNE 2004

INTRODUCTION

As part of the approval for the Consultative Environmental Review for the Fimiston Mine and Waste Dumps, 1990, KCGM was required to prepare and subsequently implement a noise and vibration monitoring and management programme. This programme meets the requirements of Condition 5 of Ministerial Statement 188 for these operations.

The Noise and Vibration Monitoring and Management Programme was developed by KCGM in January 1993. This programme was subsequently submitted to the EPA and was approved on 10 March 1993. This revised version of the noise and vibration monitoring and management programme resulted from discussions between the EPA and KCGM in May 2004.

KCGM believes this programme provides the best possible practices and procedures to allow KCGM to continue mining at Kalgoorlie in a reasonable and practicable manner, while providing an acceptable noise environment for residents of Kalgoorlie-Boulder.

Through implementation of this programme, Kalgoorlie Consolidated Gold Mines commits to undertake all reasonable, practicable and safe measures to meet the relevant standards for noise and vibration emissions from its operations.

This noise and vibration monitoring and management programme is presented in four parts:

- Part 1 Modeling and Assessment
- Part 2 Noise Control Strategy
- Part 3 Noise, Vibration and Over-pressure Monitoring
- Part 4 Community Consultation

PART 1 - MODELING AND ASSESSMENT

Since September 1991 KCGM has been guided by Herring Storer Acoustics through its undertaking of extensive modeling and assessment of KCGM operations and plans.

1.1 Modeling

The modeling carried out is primarily intended to quantify the noise environment and establish a model for planning purposes.

The modeling is primarily undertaken using the SoundPlan software programme to predict, assess and map noise. KCGM understands this programme is recognised by the Department of the Environment (DoE) as a reliable tool in the forward planning, applications assessment and operation of sites which contain noise sources as part of their operations.

The noise sources used in the modelling have been taken from actual measurements of equipment used at KCGM.

1.2 Model Validation and Direct Noise Measurements

Noise measurements have also been taken at fixed sites in residential areas. These direct measurements were carried out during the middle of the night in order to minimise the effects of other noise sources in the city.

The measurements served two main purposes:

- Validation of the predictions of the model.
- Assessment of background noise levels in the absence of mining. In order to achieve this goal, a complete shut down of the mining operation was undertaken.

PART 2 - NOISE CONTROL STRATEGY

Based on the recommendations of the noise modeling and assessment work KCGM has adopted the following methods to minimise noise emissions from its mining and mineral processing activities in Kalgoorlie-Boulder.

2.1 Environmental Noise Bund

An environmental noise bund that runs along the western edge of the KCGM open pit operation was originally established in 1993/4 and has significantly lowered noise levels in residential areas as shown by the 50dB contour lines in Figure 1.

In 2000, a major project was undertaken at the Croesus site to further extend the noise bund northwards and additional minor works were also undertaken. A history of the construction of the environmental noise bund is shown in Figure 2.

In 2004 KCGM will further extend this bund to meet the requirements of its existing Ministerial Statement, and to ensure that protection for the community from mine noise is maintained as the open pit operation and waste rock dumps develop southwards.

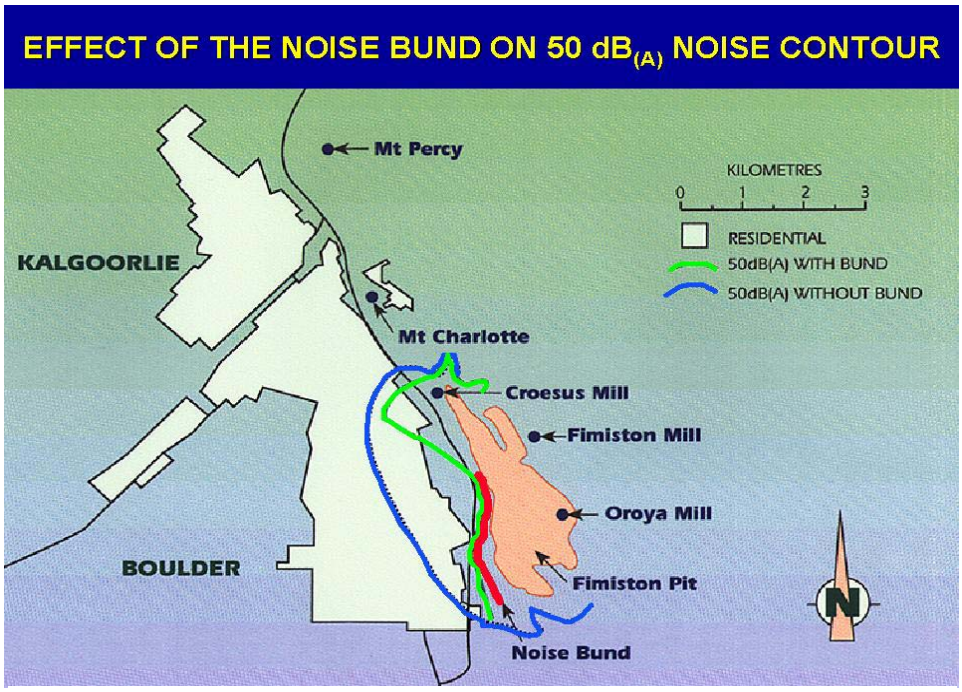

Figure 1
KCGM Noise Bund and the Impact on the 50dB(A) Contour

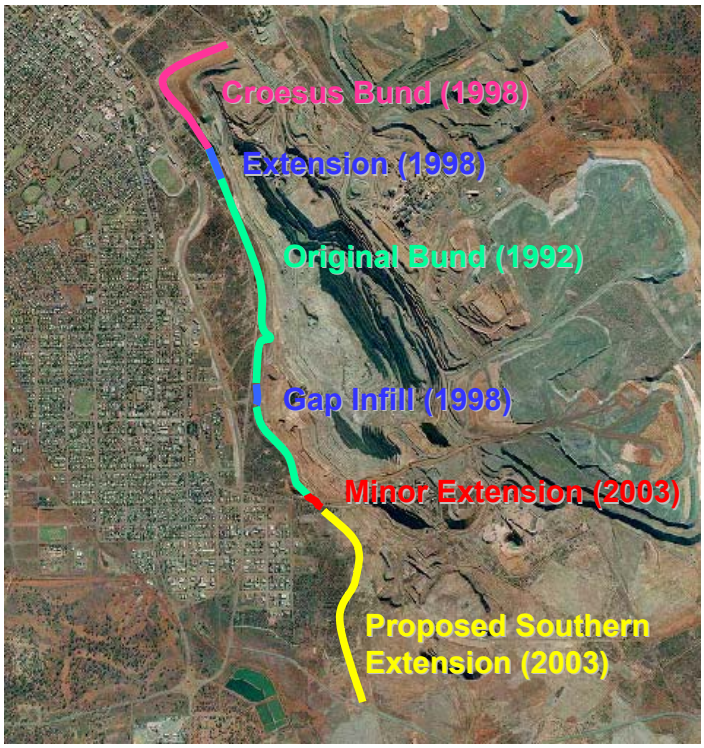

Figure 2
KCGM Noise Bund Construction History

Based on the findings of the modelling and assessment work for the construction of the environmental noise bund KCGM will:

- Ensure the quietest equipment available is used.
- Endeavour to fit all mobile equipment with “smart alarms”. Smart alarms adjust the noise level of the alarm depending on the background noise level i.e. the quieter the environment, the quieter the alarm.
- Restrict the use of equipment for the environmental noise bund construction phase to the hours of 7am to 7pm Monday to Saturday and not on Sunday or public holidays.
- Ensure that all contractors and staff involved with the southern extension undertake a site-specific induction to raise awareness including the importance of noise control.
- Ensure noise monitoring is undertaken (Refer to Part 3).
- Ongoing consultation with stakeholders to determine the success of the noise management practices.
- KCGM will undertake modelling to determine predicted noise levels during construction.

Noise levels associated with this proposal will aim to comply with the Environmental Protection (Noise) Regulations 1997 and standards specific to KCGM operations.

It is envisaged that construction of the complete environmental noise bund will take approximately 24 months (2 years) as it will be undertaken during day shift only to ensure nearby residents are not affected by noise from this work at night. Some additional delays may also occur as KCGM is committed to stopping work if the wind causes a dust problem to ensure that residential and business areas are not unduly affected by dust.

However the aim is to undertake the construction in stages to allow rehabilitation of the western face to occur immediately after the construction of each stage (assuming wind conditions are favourable). This focus on staged completion of the noise bund ensures that the noise reduction and visual amenity benefits are provided to the community in a timely manner.

2.2 Management of Operations

KCGM operations are planned and managed so that due consideration is given to noise emission levels. The following activities are recognised as significant noise sources and will be managed as outlined below:

2.2.1 Surface Activities

Where appropriate, noisier activities such as long hole percussion drilling and rockbreaking (Figure 3) will, when carried out at the surface and where they could foreseeably result in exceedence of noise standards, be restricted to the time period 0700 hours to 1900 hours.

Figure 3
Rockbreaking on the Surface
is Restricted to Day Time Only

2.2.2 Mobile Equipment

Noise emissions from mobile equipment used for production (e.g. haul trucks, front end loaders, face shovels and long hole percussion drills) will be measured, and appropriate engineering noise control techniques will be applied to this equipment, to the extent that such techniques are reasonable, practicable and safe in a mining environment. In 2002 KCGM undertook an improvement programme to retrofit existing trucks with quieter engines; new trucks purchased have quieter engines and fans as a standard. KCGM is trialling a Cat 793C "XQ" (extra quiet) truck on site (Figure 4), which as the name suggests has additional noise control features. This type of truck has not previously been used in the Goldfields and it is undergoing an extensive trial period in order to measure its operational performance.

Figure 4
Cat 793 "XQ" Truck is Being Trialled

2.2.3 Reversing Alarms

Reverse warning alarms are required for safety purposes on all mobile equipment operating on any mining or mineral processing site. The signals from audible alarms are by design, intrusive in nature and are recognised as a significant environmental noise source. KCGM endeavours to fit all mobile equipment with “smart alarms”. Research will continue into the feasibility of using mechanisms other than audible signals, which adequately alert nearby people. Alarms, which this research indicates will reduce noise emissions without jeopardising safety standards and which are approved by the Department of Industry and Resources (DoIR) will be adopted. To date this research has identified the use of visual high intensity magenta strobe lights. KCGM now uses these strobe lights on night shift in a limited access and high elevation area.

2.2.4 Open Pit Blasting

Primary blasting will be carried out only between 0900 hours and 1730 hours, and will, wherever possible, occur at a fixed publicised time each day or at a later fixed and publicised time where weather or safety requirements preclude blasting at the earlier time. Wherever possible, explosives placed for surface blasts will be detonated when weather conditions are such that the impact of air-blast over pressure and dust emissions on residential areas of Kalgoorlie-Boulder are minimised.

PART 3 - NOISE VIBRATION AND AIR-BLAST OVER PRESSURE MONITORING

Continuous noise monitoring for KCGM operations occurs at two sites in the residential areas of Kalgoorlie-Boulder (Figure 5). To establish the contribution of mining noise at the monitoring sites, a tape recorder tripping mechanism is used.

Mining noise can be most noticeable when traffic noise is at a minimum, i.e. in the evening or early morning hours. The tape trigger is set to operate during this time (1900 hours to 0700 hours). A tape trigger event is recorded when the noise level exceeds 60 $dB_{(A)}$ between 7:00 pm and 10:00 pm and 55 $dB_{(A)}$ between 10:00 pm and 7:00 am for more than two minutes.

An additional monitor will be established to measure potential noise from the proposed southern extension of the environmental noise bund. This monitor will be set up in the light industrial area between the Bypass Road and proposed noise bund.

It is proposed that this noise monitor will be operated during the environmental noise bund construction times. To minimise the impact on the nearby stakeholders the construction is restricted to the hours of 7:00am to 7:00pm Monday to Saturday and not on Sunday or public holidays.

Noise emissions shall not, when measured outdoors, at the approved sites locations, in the presence of other noise in the area:

- exceed both the ambient noise level present at the time by more than 5 dB L_A, and
- 40 dB L_{A10} 1 hour slow between 2200 hours and 0700 hours on any day:
- 45 dB L_{A10} 1 hour slow between 1900 hours and 2200 hours on any day, and between 0700 hours and 1900 hours on Sundays and Gazetted public holidays, or
- 50 dB L_{A10} 1 hour slow between 0700 hours and 1900 hours on Monday to Saturday.

and never exceed maxima of

- 50dB L_A slow between 2200 hours and 0700 hours on any day;
- 55 dB L_A slow between 1900 hours and 2200 hours on any day, and between 0700 hours and 1900 hours on Sundays and Gazetted public holidays, or
- 70 dB L_A slow between 0700 hours and 1900 hours on Monday to Saturday.

Tape recordings are retrieved and the dominant noise identified, where possible, for each noise event. Where the noise monitoring results show that mining noise is causing significant tape recorder trigger events these are investigated to determine the source of the noise. When the source is identified, reasonable, practicable and safe action is taken to reduce the noise where possible.

KCGM's noise management builds on continual improvement of performance in identification of these noise triggers. We ensure that the aspects of the mining operation that can impact on noise levels have appropriate control measures or improvements made where needed. We also ensure that reviews of changes are made in mining practices to head of any adverse noise impacts, through our electronic risk management systems and personnel training and awareness programmes.

Ground vibration and air blast overpressure are monitored using Blastronics µMX Remote Blast Monitors (Figure 6). There are monitors permanently installed at sites between the Fimiston Open Pit and the City of Kalgoorlie-Boulder. The trigger levels for the blast monitors are set at 1 mm/sec for vibration and 114 dB(L) for overpressure. If either of these levels are reached a result is recorded for the blast event.

In accordance with our Ministerial requirements open pit blasting operations are carried out so that:

- the air-blast over pressure level generated by any blast, does not exceed 125 dB $_{\text{linear peak}}$; and
- not more than one in any ten consecutive blasts results in an air-blast over pressure level greater than 120 dB $_{\text{linear peak}}$;

when measured at the approved monitoring site (Site F).

Vibration levels from open pit blasting will be no greater than Australian Standard AS 2187.2 - 1993 of 10mm/s and no more than 1 in 10 consecutive blasts will exceed 5mm/s.

Quarterly results from noise level monitoring are published in the Kalgoorlie Miner and a quarterly noise and blast monitoring report is submitted to the DoE in accordance with statutory requirements.

Figure 5
Noise Monitoring Network Location Plan

Figure 6
Blast Monitoring Network Location Plan

PART 4 – COMMUNITY CONSULTATION

KCGM has a 24-hour Public Inquiry Line that can be contacted for a wide range of issues including emergencies, complaints, inquiries and feedback. Both the public and employees (including contractors) are encouraged to use the Public Inquiry Line for any matter relating to the operations. It is a particularly important avenue for capturing those issues which require follow up and action.

This feedback from the Public Inquiry Line system is very effective in helping to make KCGM aware of issues that are of concern to the community such as noise, dust or blasting. Being aware of the problems allows KCGM to investigate and implement control measures to address any community concerns.

KCGM also uses its noise monitoring results as an indicator for potential concern for residential areas (even if no complaints are received). Where the noise monitoring results show that mining noise is causing significant tape recorder trigger events these are investigated to determine the source of the noise. When the source is identified, reasonable, practicable and safe action is taken to reduce the noise where possible.

In addition and to complement many of the community relations activities that KCGM undertakes, the company established a Community Reference Group (CRG) in late 1999. In 2001, the group was revitalised with a call for new members. The CRG includes community members who meet monthly to discuss issues that are of importance to both the community and KCGM.

KCGM is committed to ongoing consultation with our key stakeholders to determine the success of the noise and vibration management practices and where required investigate and implement additional control measures to address any community concerns.

This noise and vibration monitoring and management plan may be modified from time to time to reflect updated practices and procedures.