FIMISTON

AIR QUALITY MANAGEMENT PLAN

for

KALGOORLIE CONSOLIDATED GOLD MINES (KCGM)

September 2007

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Ref: Fimiston AQMP Final (070906).doc
6 September 2007

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Kalgoorlie Consolidated Gold Mines
Black St
Kalgoorlie WA 5430

Attention: Michelle Berryman

Dear Michelle,

FIMISTON AIR QUALITY MANAGEMENT PLAN

We are pleased to present the Fimiston Air Quality Management Plan (AQMP) prepared fro KCGM.

Should you require any additional information, please contact the undersigned directly.

Yours faithfully
ENVIRON Australia Pty Ltd

Brian Bell
Manager, Western Australia

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Kalgoorlie Consolidated Gold Mines (KCGM)

1. INTRODUCTION

Kalgoorlie Consolidated Gold Mines (KCGM) operates the Fimiston Operations on behalf of its Joint Venture Owners – Barrick and Newmont. The Fimiston Operations are located immediately east of the City of Kalgoorlie-Boulder in the Goldfields region of Western Australia. KCGM is the largest gold producing operation in Australia and in 2006 had an annual gold production of approximately 680,000 ounces (21 tonnes) and currently has an estimated gold reserve of around ten million ounces. Currently, KCGM is proposing to extend its operations to include the mining of a westerly cutback, known as 'the Golden Pike Cutback' of the Fimiston Open Pit (the "Superpit"). The 46 ha extension will allow for both the widening and the deepening of the pit to a depth of around 600 m and extend the life of the open pit by five years to 2017.

Due to the proximity of the Fimiston Operations to the residential areas and nearby Ninga Mia aboriginal community of the City of Kalgoorlie Boulder, the successful management of environmental issues has been a key component of KCGM's ongoing management. Specifically from an air quality perspective, the main issues arising from the Fimiston Operations are primarily focussed on the management of dust emissions from the site and mercury emissions from the carbon regeneration kilns that are located at the Fimiston Mill.

KCGM has developed and implemented a number of management plans that cover various aspects of its operations including:

1. A Blasting Dust Management Plan (BDMP). Blasting activities have the potential to cause very high short term particulate emissions and therefore need to be carefully managed and planned, particularly for blasts that occur near ground level. For wind direction sensitive blasts, the BDMP utilises the Bureau of Meteorology (BoM) forecasts together with real time wind monitoring data to determine if conditions are satisfactory for a surface blast to be undertaken. The BDMP is outlined in Section 3.

2. A Dust Monitoring and Management Program (DMMP). As part of the Public Environmental Review (PER) for the Fimiston Gold Mine Extension, KCGM is revising its existing DMMP to include the construction and operation of the Fimiston Open Pit extension. The objective of this revised DMMP as stated in the PER is:

   > *To ensure that dust emissions do not adversely affect environmental values or the health, welfare and amenity of people and landuses by meeting statutory requirements and acceptable standards.*

   This revision of the DMMP includes modernisation of the ambient dust monitoring program to include real time data and is outlined in Section 4.

3. Carbon Kiln Mercury Emissions Reduction Program (CKMERP). The Carbon Regeneration Kilns located at the Fimiston Mill have been identified as a source of mercury emissions to the atmosphere. While air dispersion modelling indicates that the predicted ambient air quality impacts of the Carbon Kiln mercury emissions in the City of Kalgoorlie-Boulder are within acceptable guidelines, KCGM has implemented a program to remove mercury from the Carbon Kiln emissions. Additional detail regarding the CKMERP is outlined in Section 5.

While each of the above programs is managed separately due to their different approaches, requirements and areas of application, this Fimiston Air Quality Management Plan (FAQMP) has been produced to ensure that they are managed within a consistent and integrated framework. KCGM's Environmental personnel have an active involvement in all stages of these programs to ensure consistency and focus across the site is maintained. The Safety and Environment Department also ensure that air quality issues that span KCGM's operations, such as mercury, are considered holistically.

Common elements to all of KCGM's air quality management plans include a regular review cycle (Section 6) and public consultation (Section 7).

2. FIMISTON OPERATIONS

KCGM's Fimiston Operations include the Fimiston Open Pit, Fimiston Mill, and the Mt Charlotte Underground Mine. Approximately 85 million tonnes (Mt) of material (i.e. ore and waste) are removed from the Fimiston Open Pit each year. Approximately 13 Mt of ore is separated and treated at the Fimiston Mill with the remaining material transported to various waste rock dumps or marginal ore stockpiles surrounding the pit perimeter. The Fimiston Open Pit is located on the eastern boundary of the City of Kalgoorlie-Boulder. The current footprint of the Fimiston Open Pit extends approximately 1.5 km in width, 3.4 km in length and to a depth of approximately 360 m and is the largest open pit gold mine in Australia. The current approved Fimiston Open Pit enables mining until 2012 with the proposed expansion extending the life of the open pit to 2017.

The major operations that take place at the Fimiston operations include the following:

1. Drilling and Blasting: Drilling and blasting is undertaken to break and loosen the rock material for extraction by hydraulic shovels. Blasting operations in the pit are restricted to daylight hours and to favourable wind conditions for surface blasts that have the potential to create large emissions that may blow over the City of Kalgoorlie-Boulder. The scheduled blast times are typically at 1pm or 5pm each day but if unfavourable winds, or safety issues arise, blasting may be undertaken anytime during daylight hours.

2. Mining, Load and Haul Operations: Mining is undertaken using hydraulic shovels that load haul trucks that can carry up to 225 t of ore and waste rock. Trucks transport the various grades of ore to the mill to be processed or stockpiled and waste is trucked to various waste rock dumps. Mining is undertaken 24 hours a day, 7 days per week, 365 days a year.

3. Ore Processing: The Fimiston Mill comprises two separate ore processing circuits; one for processing low grade ores and the other for processing primary sulphide ore from the Fimiston Open Pits and Mt Charlotte Underground Mine.

   The primary ore is treated through the following processing circuit at Fimiston:

   a. primary crushing plant;
   b. semi-autogenous grinding mill with pebble crushing unit;
   c. two ball mills; and
   d. flotation and two carbon-in-leach circuits.

4. Waste Rock Dumps: It has been estimated that a further 908 Mt of waste rock will be generated by the Fimiston Open Pit (inclusive of the Golden Pike Cutback) prior to the mine's closure in 2017. This material will be located into waste rock dumps (WRDs) surrounding the eastern, northern and southern sides of the pit as well as internally within parts of the pit void.

5. Tailings Storage Facilities (TSF): KCGM currently operates two TSFs for the Fimiston operations called Fimiston I and Fimiston II TSF. These facilities store all of the tailings generated from crushing, grinding and leaching of about 13 Mt of ore per year. Fimiston II TSF takes around 80% of tailings with the remainder going to Fimiston I TSF.

Due to the magnitude and proximity of the Fimiston Operations, fugitive dust represent the most discernable emissions and these are managed through the DMMP and BDMP components of the FAQMP.

The management mercury emissions from KCGM's operations is a key focus following the identification of this emission. The primary sources of mercury emissions from KCGM's operations are:

1. the Carbon Regeneration Kilns located at the Fimiston Mill; and
2. the Gidji Gold Roasters located approximately 17 km north of Kalgoorlie.

Mercury is known to be contained within coloradoite, one of a suite of telluride minerals that are rare but widely distributed through the Golden Mile lodes and represents typically less than 0.00014% of the ore mined at the Fimiston Open Pit operations. The typical percentage of mercury present in the ore within the Fimiston Mill circuit is slightly less than 0.00014%.

The processing of the ore at the Fimiston Mill results in a concentration of the mercury in the following manner:

1. the sulphide concentrate, processed at Gidji, is produced by the Fimiston flotation circuit and contains over 90% of the mercury in the ore; and
2. the Carbon in Leach (CIL) circuit, used to leach and collect gold onto carbon, results in mercury being leached and collected. While the subsequent process that recovers the gold from the carbon results in some of the mercury being released, most of the collected mercury is retained on the carbon. The majority of this mercury is then released from the carbon in the carbon regeneration kilns.

Mercury is also present in the waste rock (typically 0.00001%) and as such KCGM undertook an analysis of a number of filter papers collected by its ambient high volume sampler network (ENVIRON, 2007). This analysis showed that the maximum level of mercury present in the ambient dust samples was around 0.002% or less than 0.01 µg/m^3 over a 24-hour period.

This maximum mercury level was recorded in a Total Suspended Particulate (TSP) sample and was much higher than the result obtained from all of the other filters that were analysed (which was 0.0001%). The calculated ***24-hour average*** mercury concentration in the maximum sample was less than 1% of the WHO ***annual average*** guideline. Therefore mercury contained in fugitive dust emissions from KCGM's operations is considered to represent a very small and negligible environmental and health risk. Additional information on metals in dust is presented in ENVIRON (2007).

3. BLASTING DUST MANAGEMENT PLAN

Some blasting activities at the Fimiston Open Pit have the potential to cause very high short term particulate emissions. In simple terms, a blast is defined as a single pattern of holes that are fired in a sequence to fracture the rock to enable the digging by hydraulic shovels and subsequent transport of the material by trucks.

Prior to a blast being conducted, it is necessary to classify the potential for the blast to result in high dust emissions being blown over the residential areas. Blasts that are deemed likely to result in dust being blown over residential areas are termed "Wind Direction Dependent" blasts. Wind Direction Dependent blasts are usually related to surface blasting undertaken in the upper benches of the Pit. All other blasting is considered to be non-wind dependent unless special circumstances are identified.

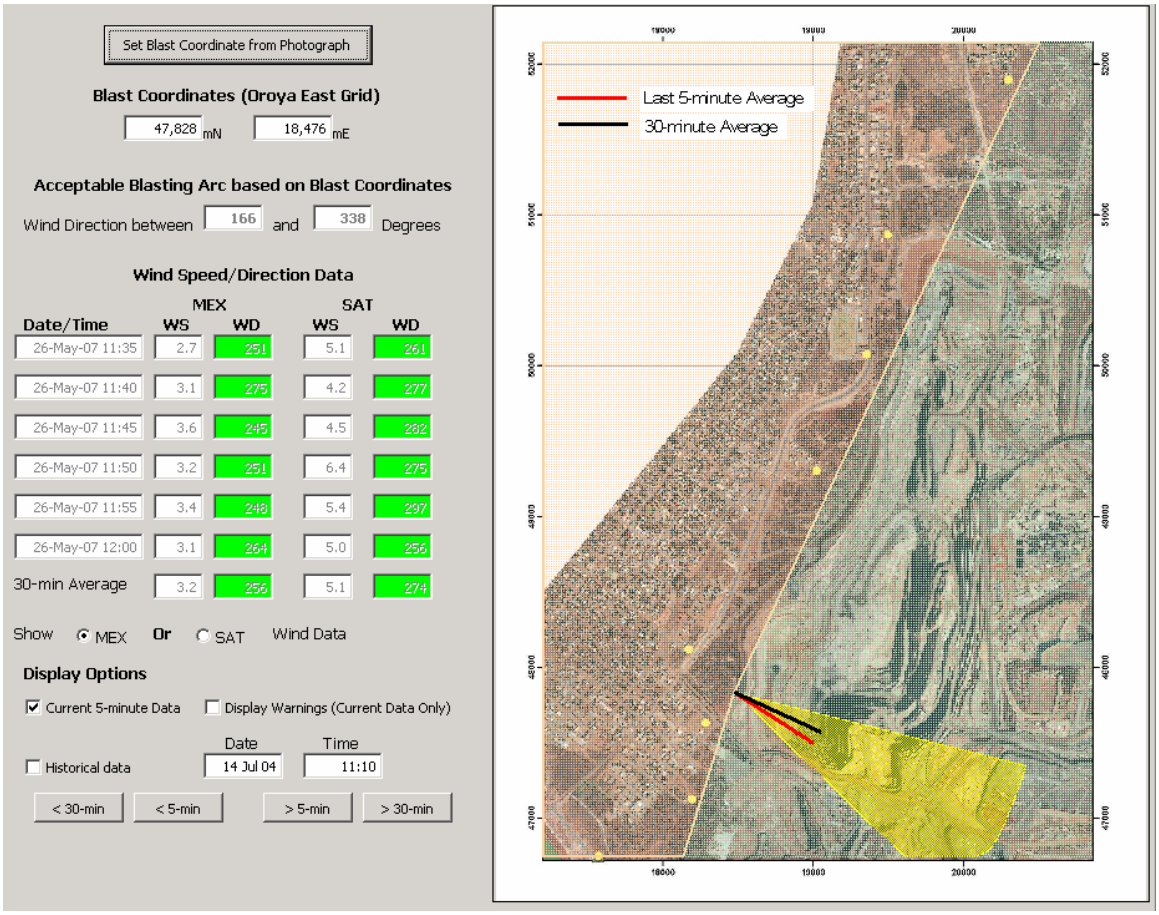
Table 1 identifies the action allowable on each classification of blast.

Table 1: Blasting Classifications, Conditions, Permission and Restrictions

Classification	Special Conditions	Permissions	Restrictions
Non-Wind Dependent	Nil	Drill and Blast Engineer	Blasting at any time according with KCGM procedures
Wind Direction Dependent	Nil	Drill and Blast Engineer	Blasting only when wind conditions permit as per KCGM Dust Program
Wind Direction Dependent	Dust mitigating circumstances (e.g. rain)	Drill and Blast Engineer Environmental Officer	Decision to blast on a case by case basis
Wind Direction Dependent	Safety issues exist i.e. lightning	Drill and Blast Engineer Environmental Officer	Decision to blast on a case by case basis
Wind Direction Dependent	13 days sleep time for explosives is approaching	Drill and Blast Engineer Environmental Officer	Blasting on day and or at time of the day to cause least inconvenience

The KCGM Dust Program is an Excel spreadsheet that was created to graphically display the current wind speed and direction data recorded at the Metals Exploration (MEX) and Cassidy Headframe (CAS) monitoring stations. Figure 1 provides and example of the KCGM Dust Program display.

Figure 1 – Sample Display From the KCGM Dust Program Excel Spreadsheet.



The KCGM Dust Program can be used by the Drill and Blast Engineers (or the Safety and Environment Department) to locate the position of the blast. The program then calculates and displays the acceptable wind direction arc within which Wind Direction Dependent blasts can be undertaken. The wind directions recorded over the last 30-minutes at both MEX and CAS are shaded green if they fall within the acceptable arc (as seen on Figure 1) and red if they fall outside of the acceptable arc.

Prior to the scheduled time for a Wind Direction Dependent blast, the KCGM Dust Program is reviewed and a blast is allowed to progress if:

1. at least four '5 minute' boxes in the wind sample boxes are shown as green, and the 30 minute average is shown as green;
2. the variation in the measured wind direction (as depicted in yellow) is narrow (less than 60º); and
3. the 30-minute average wind speed is greater than 2 m/s.

Conditions 2 and 3 are relaxed (or considered not applicable) when the prevailing winds are clearly in the 'green' arc and forecast to stay that way.

Fifteen minutes prior to a Wind Direction Dependent blast being initiated, a final check of the data provided by the KCGM Dust Program is undertaken to ensure that the conditions for a blast remain favourable. If this is the case, then the blast is fired.

Occasionally, it is necessary to fire a Wind Direction Dependent blast even though favourable wind conditions do not exist. Such a situation will occur, for example, should the explosives have been in place for up to 13 days. At this time, the explosives need to be fired for safety reasons as they may not detonate properly if left *in-situ* any longer. Each of these situations is considered on a 'case by case' basis and appropriate environmental and managerial permissions are obtained as applicable prior to such a blast being undertaken.

4. AMBIENT DUST MONITORING AND MANAGEMENT PROGRAM

KCGM has successfully managed its operations to control dust emissions through the implementation of its Dust Monitoring and Management Program (DMMP). This revision of the DMMP includes a significant expansion and modernisation of the ambient monitoring program to include real time PM_{10} monitoring data.

4.1 DUST EMISSIONS

4.1.1 Current Operations

The major sources of dust emissions identified for the Fimiston operations include:

- drilling;
- blasting (discussed in Section 3);
- loading and unloading of ore and waste rock;
- vehicle generated dust from loaders and dozers;
- haulage of ore and waste rock;
- wind erosion in pit and from waste dumps, TSF, service corridors and stockpiles;
- crushing; and
- conveying.

4.1.2 Proposed Operations

The proposed Golden Pike cutback along the western edge of the existing Fimiston Open Pit will have a surface extent of 46 ha and will allow the pit to be deepened to around 600 m. As with all mining operations, this cutback will result in fugitive dust emissions being generated and the closer proximity to residential areas leads to an increased focus on managing these emissions.

Construction Impacts

Dust emissions that will occur during the construction period include those generated from wind erosion, removal of topsoil and overburden and vehicle movement. In particular these emissions will arise during:

1. the construction and realignment of the environmental noise bund which is in close proximity to residential areas;
2. the clearing of topsoil and surface works prior to waste dump commissioning; and
3. topsoil removal and surface works involved with the Golden Pike Cutback.

Management measures to manage these emissions are detailed in Section 4.2.

Operational Impacts

Once the construction activities associated with the Golden Pike Cutback have been completed, fugitive dust emissions will be very similar to those occurring for the existing operations. However, as the Golden Pike Cutback is located closer to residential areas and the initial mining will be at the surface, the potential for increased dust emissions to occur is higher than for the current operations.

The dust modelling study undertaken by ENVIRON for KCGM as part of the PER indicated that the 24-hour average PM_{10} ground level concentrations resulting from KCGM's operations are predicted to be below the NEPM standard at the nominated receptors for both the current and proposed operations, with the exception of the Hewitt St receptor (see Figure 2 for locations of monitoring receptors).

The modelling results indicated that there is a small predicted decrease in the predicted ground level concentrations at the Hewitt St receptor following the implementation of the proposed extension. However at other receptors to the west of pit, the predicted ambient PM_{10} concentrations from the proposed extension will be marginally higher than those predicted for current emissions. However, the modelling results are only indicative as they are influenced by a number of factors including the effectiveness of the management measures. The revised DMMP and the inclusion of real time ambient PM_{10} monitoring aim to enable KCGM to manage its operations such that the NEPM standard is met beyond its Fimiston Operations' boundary. These data may also be used for refinement of the air dispersion model over time.

4.2 DUST MONITORING PROGRAM

4.2.1 Siting

The number and location of monitors recommended for this DMMP aims to provide representative data of the potential ambient PM_{10} concentrations that may occur as a result of fugitive emissions from KCGM's Fimiston operations. The results of the fugitive dust emissions modelling study conducted for the PER, and subsequently refined as part of the particulate metals study, have been used to assist in the determination of these monitoring locations.

KCGM currently obtains daily forecast data provided by the Bureau of Meteorology (BoM) and real time (5-minute averaged) wind data from the MEX and the CAS monitoring sites (see Figure 2). As, discussed in Section 3, these date are used within the BDMP to assess the suitability of the prevailing conditions for blasting. The data have also been used to help manage and mitigate potential dust emissions during other specific actives such as the construction of the southern extension to the noise bund. Visual inspections for dust emissions are also carried out on a regular basis.

Continuous PM_{10} monitors are now in operation at the Hannan's Golf Course (HGC), Boulder Shire Yard (BSY), Hewitt Street (HEW), Clancy Street (CLY) and Hopkins Street (HOP) sites. These locations will provide coverage of the residential areas and data that will be used to help with the ongoing assessment and management of ambient dust emissions from the Fimiston operations. The MEX and CAS weather stations are considered to be sufficiently representative of the general wind conditions at the site and will continue to be used (Figure 2).

Figure 2: Monitoring Locations for Fimiston Open Pit Operations.

Note: (1) Green dots indicate continuous PM_{10} monitoring stations.
(2) Red dots indicate wind speed and wind direction monitoring stations.

4.2.2 Equipment

Electronic Beta Attenuation Monitor (E-BAM) samplers, fitted with PM_{10} inlets have been commissioned at the Hewitt Street, Clancy Street and Hopkins Street sites and will replace the three Hi-Volume Air Samplers (HVAS) currently operated at these locations. The E-BAM samplers will be used to provide average PM_{10} concentrations at 10-minute intervals to enable any high short term PM_{10} concentrations to be detected and assessed on a real time.

The BAM samplers currently located at BSY and HGC, are configured to monitor the 5-minute average PM_{10} concentrations and these will continue to be operated at these sites.

4.2.3 Data Interpretation and Reporting

The reactive component of the DMMP is based on management practices being implemented within targeted areas in response to ambient PM_{10} concentrations that are higher than predefined levels being recorded at the monitoring stations, or visual observations of elevated dust emissions from KCGM's site. The continuous monitoring system will notify the Open Pit Dispatch Room through an audible alarm and will provide operators with the location of the monitor, reading received and the associated wind speed and wind direction leading up to the reading.

This information will be utilised by the KCGM Dust Program to provide a visual representation of the location of the potential source of emissions. If the data indicates that the Fimiston Operation is the possible source, the Dispatch Operator, Shift Supervisor or nominated person will determine what activities are occurring in the indicated area and implement control measures as appropriate. Levels of alarms, control measures to be implemented and the authority to implement these actions as part of the reactive component of the DMMP are further detailed in Section 4.4.2.

4.3 MANAGEMENT MEASURES

Dust management practices implemented by KCGM have proven to be successful and include (but are not limited to):

- monitoring current and forecast wind conditions using daily forecasts from the BoM and real time wind speed and direction monitoring data to minimise off-site dust emissions as a result of blasting (see Section 3);
- use of water trucks and water cannons in areas that produce dust such as haul roads, service corridors and other active surfaces. Fresh water is used on areas to be rehabilitated;
- undertake visual inspections for dust generation on a regular basis;
- use of additional dust control measures where practical (e.g. a dust binding agent);
- progressive rehabilitation to minimise exposed areas;
- suspending work in a particular area or for a nominated activity as deemed necessary based on inspections, public feedback or prevailing conditions;
- ensuring that all contractors and staff undertake site-specific inductions which include raising awareness of the importance of dust control;
- ensuring dust monitoring is undertaken and the results of this monitoring are reviewed; and
- ongoing consultation with stakeholders to determine the success of the dust management measures.

KCGM continues to work on reducing the impact of dust from its operations. Investigations are ongoing into best practice management and improvements made when identified.

The above management practices are primarily the responsibility of the Shift Supervisor and the nominated Environmental Officer. However, each employee and contractor is made aware of the importance of dust control via the induction program and will notify the Shift Supervisor or the nominated Environmental Officer in the event of an unusual emission.

This DMMP also includes a reactive management component based on the real time ambient PM_{10} monitoring network. In order to implement this reactive component, a series of measures are required including:

1. Determination of appropriate "alert levels" and "action levels" (defined in Section 4.4.2) for ambient PM_{10} concentrations over different time periods. Levels will be determined to ensure that dust control actions are implemented in a timely manner to reduce the emissions from identified sources that are associated with KCGM's operations. These levels will be low enough to allow adequate response time to ensure that levels are less than the 24-hour NEPM PM_{10} standard, but be high enough to ensure that they do not unduly disrupt normal operations (without due cause). The objective of the alert levels and action levels is to reduce the extent of KCGM's contribution to any levels that may approach or exceed the 24-hour NEPM guideline for PM_{10} and to reduce the occurrence of short term high concentration events.

2. Determination of the most appropriate response time in the event that an alert level or action level is triggered. This may include consideration of wind speed and travel time. The response time is the elapsed time taken to implement control measures following an alarm condition being raised.

3. Training in the implementation and use of the control strategies by staff to ensure a standard approach is utilised for control of dust emissions prior to nominated levels being triggered.

OBJECTIVE

To pro-actively manage site operations to ensure that 24-hour average PM_{10} concentrations are less than the NEPM guidelines at the monitoring locations and to reduce the occurrence of short term high concentration events that occur as a result of KCGM's operations.

4.4 DUST MANAGEMENT STRATEGY

4.4.1 Predictive Control Strategy

As discussed in Section 3, the BDMP uses forecast wind conditions from the BoM, to assist with the planning of blasting. Real time wind speed and direction monitoring data are then utilised to determine if conditions are suitable for blasting, prior to the blast being undertaken. The KCGM Dust Program display (Figure 1) provides a visual representation of potential direction of the dust dispersion based on current wind conditions and is used as part of the decision process to proceed with, or delay, a Wind Direction Dependant blast. The display also provides the wind speed and wind direction data recorded over the last 30-minutes that are used in determining if conditions are suitable for blasting.

4.4.2 Reactive Component of DMMP

The reactive component of this DMMP is based on comparing ambient PM_{10} monitoring data, over predetermined time periods, to defined "alert levels" and "action levels". In the event that ambient PM_{10} concentrations measured at the monitoring locations are above one of these levels then the real time wind monitoring data, along with observation of activities being undertaken, will be used to identify the potential sources of the emission. The reactive component of the DMMP will also contain an alarm system in the case of missing data or instrument failure requiring remedial action.

The goal of the DMMP is to manage KCGM's operations such that the average ambient concentrations arising from its operation are less than the NEPM 24-hour PM_{10} standard (50 $\mu g/m^3$). As there will be Alert and Action levels defined for short term (i.e. 10-minutes to 1-hour) averaging periods the DMMP will implicitly include a focus on the management of episodic short term dust concentrations.

Initially, the alert levels and action levels will be determined by assessing the current BSY BAM PM_{10} monitoring data on days where the measured 24-hour average PM_{10} concentration was greater than 50 $\mu g/m^3$. This analysis will determine the average and maximum of the peak (initially 10-minute and 6-hour averages) to mean (24-hour average) ratios from the monitoring data. The "alert levels" will be set at a point that is at or below the average peak to mean ratio while the "action levels" will be set at a point at or below the maximum peak to mean ratio.

It is expected that the peak to mean ratios determined from the BSY BAM PM_{10} data will not be entirely representative of the peak to mean ratios that may occur at the other monitoring stations and that these ratios will change over time as more data become available. Therefore, the "alert" and "action" levels will be reviewed on a regular basis (annually initially, or following any high level events) based on the monitoring data collected at each monitoring station.

Alert levels will be set at values that are indicative of the possibility of on-site activities contributing to ambient concentrations that may approach the NEPM standard and where reasonable and practicable management measures could be implemented to reduce this risk.

Action levels will be set at values that indicate it is likely that on-site activities are contributing to ambient concentrations that may be higher than the NEPM standard and where reasonable and practicable, immediate management measures should be implemented to reduce this potential.

In the event of an alarm (Alert or Action) being triggered, the system will notify the Open Pit Dispatch Room through an audible alarm and will provide operators with details on the location of the monitor, reading received and wind speed and direction at the time of the reading. This information will be utilised with the KCGM Dust Program to provide a visual representation of the location of the potential source of emissions based on the available wind monitoring data.

For Alert alarms that are potentially associated with KCGM, the Dispatch Operators will have the authority to implement dust management actions appropriate to the source of emissions. An Action alarm that is linked to KCGM's operations will require immediate action and must be addressed by the Shift Supervisor or nominated person as control measures may include the delay or suspension of work.

In all cases the Shift Supervisor and nominated Environmental Officer will be informed of any alarms and subsequent control measures implemented. The nominated Environmental Officer will also follow up on actions to ensure that the required management measures were implemented accordingly. Relevant information (e.g. winds, PM_{10} concentrations) can also be displayed via a modified version of KCGM's Dust Program display (Figure 1) on a real time basis to further assist with the identification of the potential source(s) of elevated emissions.

Table 2 and Figure 3 show the information flow that will occur on an ongoing basis as part of the DMMP.

Table 2: Reactive Alarms Based on Monitoring Data

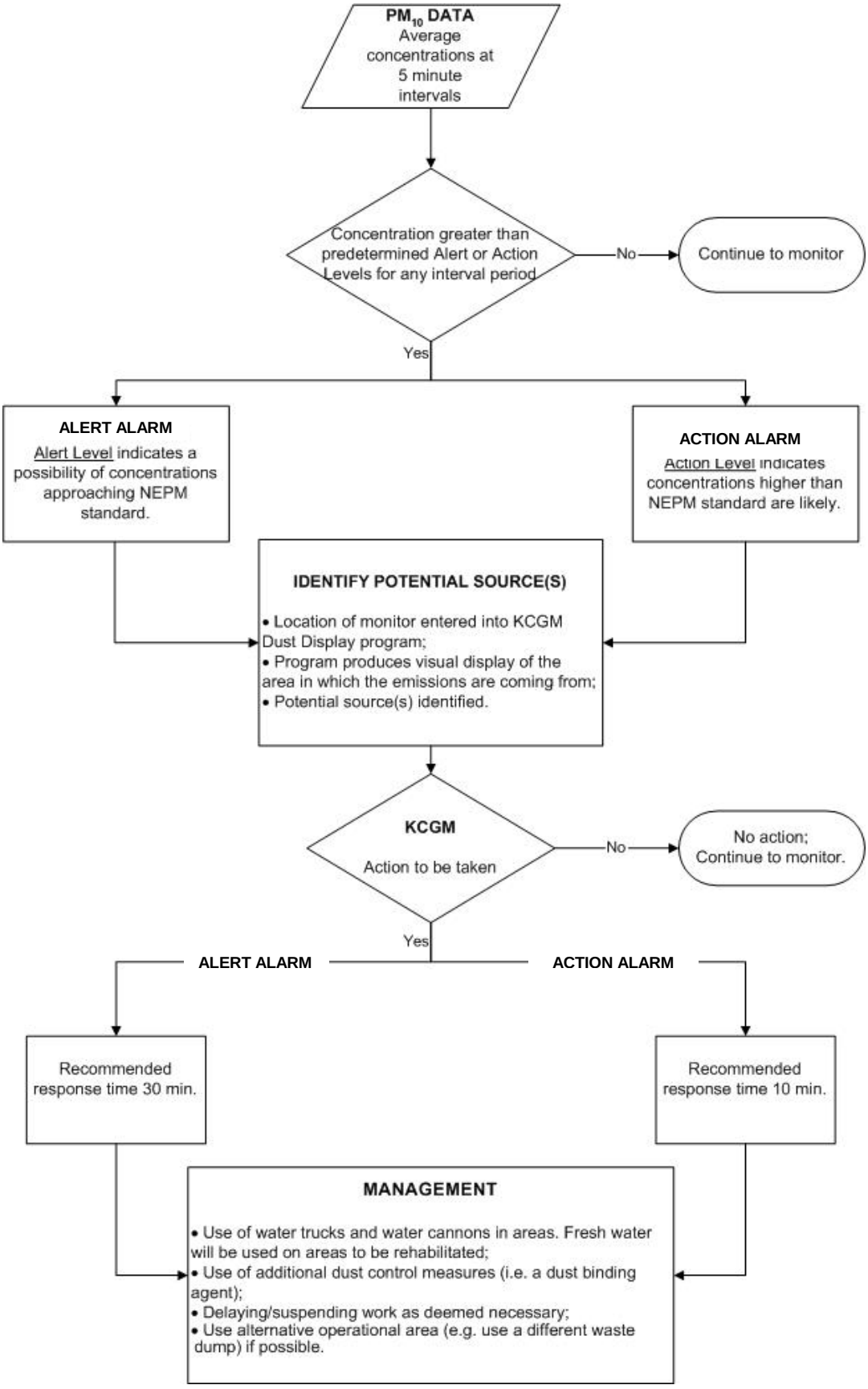
Interval Period	Description
10 minutes – 1 hour	PM_{10} peak concentrations over a 10 minute – 1 hour period.
6 hours – 12 hours	PM_{10} peak concentrations over a 6 – 12 hour period.
24 hours	PM_{10} concentrations over 24 hours.

Alarm	Action	Response Time
Alert	Reactive alarm based on levels above an interval period alert level at one of the boundary monitors. Implementation of preventive measures required.	30 minutes
Action	Reactive alarm based on levels above an interval period action level at one of the boundary monitors. Implementation of immediate action measures required.	10 minutes

Conditions that Trigger an Alarm		
	Conditions	
Alert	**Hewitt St**	Reactive alarm based on levels above an interval period alert level of the applicable concentration ($\mu g/m^3$) at the monitor.
Alert	**Clancy St**	
Alert	**Hopkins St**	
Alert	**Boulder Shire Yard**	
Action	**Hewitt St**	Reactive alarm based on levels above an interval period action level of the applicable concentration ($\mu g/m^3$) at the monitor.
Action	**Clancy St**	
Action	**Hopkins St**	
Action	**Boulder Shire Yard**	

Preventive Measures
Assessment of real time wind data to identify the potential source(s) of the dust. Visual observations of KCGM's operations may also be used to assist with the identification of source.
Application of management/control practices on the identified source(s) if these sources are associated with KCGM's operations.

Figure 3: Process flowchart for Reactive Control Strategy



4.5 KEY PERFORMANCE INDICATORS FOR THE DMMP

KCGM's primary objective for the DMMP is to pro-actively manage its Fimiston Operations to ensure that the 24-hour average PM_{10} concentrations are less than the NEPM guidelines at the monitoring locations and to reduce the occurrence of short term high concentration events that occur as a result of its operations.

There are many natural and anthropogenic sources of particulate emissions in the Goldfields Region and it is not unusual to have regional dust storms that can result in significant ambient PM_{10} concentrations over a wide area. KCGM proposes to use data from its entire monitoring network (five continuous PM_{10} monitors and two wind speed and wind direction monitors) to assess its potential contribution to any elevated concentrations.

The data from PM_{10} monitors, in combination with the wind data will be used to identify the potential source of the emissions using back trajectory analysis techniques. If several of the monitors are recording high PM_{10} concentrations at any one time, this may indicate that the emissions are from more regional sources than KCGM specific sources. In all instances where an "alert" or an "action" level is triggered, the ambient monitoring data will be reviewed at that time and this review may include observations to aid in the identification of emission sources.

KCGM's key performance indicators for the DMMP are:

- No increase or a reduction in the number of complaints associated with dust reportedly from KCGM's operations.
- Greater than 90% availability of the continuous PM_{10} monitoring data available from all PM_{10} monitoring stations on an annual basis.
- Quarterly calibration of dust monitoring equipment.
- Assessment of data associated with days where the monitored 24-hour PM_{10} concentrations were greater than 50 $\mu g/m^3$ that may have been associated with KCGM's operations. Corrective actions arising from these assessments would be recommended where appropriate.
- Annual reporting of the performance of the DMMP including monitoring results and any modifications recommended from assessments or reviews in the KCGM Annual Environment Report.

4.6 SUMMARY OF DUST MONITORING AND MANAGEMENT PROGRAM

Table 3: Summary of Dust Monitoring and Management Plan

Management Objective	Strategy	Description	Action	Responsibility
1. 24-hour average PM_{10} concentrations as a result of KCGM's emissions are less than NEPM guidelines at specified monitoring locations indicative of dust impact upon adjacent community;	1.1 Current Operational Management	1.1.1 Current management measures undertaken by KCGM for the operation of the Fimiston Open Pit.	• Monitoring current and forecast wind conditions to reduce off-site dust as a result of blasting; • Use of water trucks and water cannons in areas that could produce dust such as haul roads, service corridors and other active surfaces. Fresh water will be used on areas to be rehabilitated; • Undertake visual inspections for dust generation on a regular basis; • Use of additional dust control measures (i.e. a dust binding agent) where necessary; • Progressive rehabilitation to minimise exposed areas; • Delaying/suspending work as deemed necessary from inspections, public feedback or prevailing wind conditions; • Use alternative operational area (e.g. use a different waste dump) if possible. • Ensure that all contractors and staff involved with all operations undertake a site-specific induction to raise awareness including the importance of dust control; • Ensure dust monitoring is undertaken and results are reviewed; and • Ongoing consultation with stakeholders to determine the success of the dust management measures.	Drill and Blast Engineer Shift Supervisor Environmental Officer
	1.2 Predictive Control Strategy	1.2.1 BoM and real time wind data used to determine whether conditions are suitable for blasting.	Delay of blasting activities that may result in elevated dust concentrations leaving the pit in unsuitable conditions, unless safety conditions require the blast to be undertaken.	Drill and Blast Engineer Environmental Officer
	1.3 Reactive Control Strategy	1.3.1 Alert alarm triggered when PM_{10} concentrations for an interval period reach the applicable alert level at one of the boundary monitors. System identifies location of potential source through back tracking using real time data.	Reaction time 30 minutes. Determination of source of dust as per Figure 3. Implementation of appropriate action(s) in Section 1.1 of this table.	Shift Supervisor Environmental Officer

Management Objective	Strategy	Description	Action	Responsibility
		1.3.2 Action alarm triggered when PM_{10} concentrations for an interval period reach the applicable action level at one of the boundary monitors. System identifies location of potential source through back tracking using real tie data.	Reaction time 10 minutes. Implementation of appropriate action(s) in Section 1.1 of this table.	Shift Supervisor Environmental Officer
	1.4 Rehabilitation	1.4.1 Rehabilitation to minimise the extent of bare ground and dust emissions from wind erosion.	Progressive rehabilitation through the revegetation of bare ground areas between the Fimiston Open Pit and the Kalgoorlie-Boulder town site. Environmental noise bund to be constructed in stages to allow progressive rehabilitation of western face.	Shift Supervisor Environmental Officer Project Officer
	1.5 Awareness	1.5.1 Training of staff and contractors on dust control awareness.	Staff and contractors involved in all operations to undertake an environmental induction that includes dust management induction to raise awareness of dust control.	Shift Supervisor
	1.6 Consultation	1.6.1 Ongoing consultation with stakeholders to determine success of dust management strategies.	24 hour public interaction phone line for complaints, emergencies and public feedback. KCGM is committed to the continuous consultation with the community and continual improvement to its operations through this exchange of information. Feedback to the KCGM Community Reference Group.	Shift Supervisor Environmental Officer

5. CARBON KILN MERCURY EMISSIONS REDUCTION PROGRAM

Since the identification of mercury emissions from Carbon Kilns, KCGM has:

1. Developed and implemented a Carbon Kiln emissions control strategy that was initially used to restrict operation of the Carbon Kiln when the wind was blowing towards Kalgoorlie-Boulder prior to any emission reduction equipment being installed.
2. Undertaken air dispersion modelling of the mercury emissions from both the Carbon Kiln and Gidji Roasters to assess the potential health risks posed by the cumulative impacts of the emissions in Kalgoorlie-Boulder.
3. Designed and implemented an emissions reduction program to remove the majority of the oxidised mercury from the emission stream.

A scrubber to reduce mercury emissions has been designed, installed and commissioned for the Carbon Kilns. It is a hypersaline wet scrubbing system that enables the mercury to be reabsorbed back into the discharge to tailings. It is estimated that the scrubber captures between 35% and 50% of mercury emissions. Further work is planned to optimise the scrubber to improve the performance and efficiency.

6. REVIEW CYCLE

All components of the Fimiston Air Quality Management Plan are reviewed on a regular basis. These reviews may be initiated via a number of different mechanisms including:

1. Annual review of performance of the management plan components against objectives and targets with a summary of the monitoring presented in the Annual Environmental Report.
2. A change in process or operational aspect of the site.
3. Review of incidents were the monitoring data indicate that a target level has been exceeded or in response to public complaints.

Recommended management changes arising from these reviews will be made to KCGM's Manager Safety and Environment and will be implemented once approved.

7. PUBLIC CONSULTATION

KCGM has an established community consultation network and utilises a range of mechanisms to facilitate consultation and capture community input on an ongoing basis. The most significant mechanisms include:

- The Community Reference Group (CRG) - a self-selected group of local community members and invited guests from the DEC, DoCEP, DoH, DoIR and DIA. The group meets monthly to discuss current KCGM planning, operational activities and feedback from the community.

- The Public Interaction Line (PIL) (Ph. 9022 1100) - is a 24 hour, seven day a week system that is available for anyone to register inquiries, complaints or feedback and enables KCGM to track responses to issues and queries that are raised. The PIL is also used to record significant interactions with the public at the Super Pit Shop and both formal and informal meetings. The electronic database records are analysed as to the nature of the queries and reported in a number of internal management meetings and to the Community Reference Group.

- The KCGM Super Pit Shop - is situated in Burt St Boulder and provides easy access for the community to review approval and planning documentation, and to discuss queries with a range of KCGM staff. The Shop also hosts a 1:2,000 scale model of the Super Pit as it would look in 2017, based on the Life of Mine plans. This model is a centrepiece that has generated public inquiries on the post closure options.

- Media Management - KCGM has actively engaged the media to promote discussion on planning and project issues, and all media mentions have been recorded and are available electronically through the Super Pit Shop.

- Public Speaking Opportunities - KCGM actively works to participate in a number of local forums to discuss ongoing approvals and issues of interest to the community. Of particular note is the annual "What's Down the Track" forum at the Goldfields Mining Expo which outlines the next three years for development for mining and related operations. The KCGM General Manager has presented KCGM plans to 2017 and opportunities to extend the mine life in the last two years. Other forums include Rotary, the Kalgoorlie-Boulder Chamber of Commerce & Industry and the Goldfields-Esperance Development Commission.

KCGM is committed to the continuous consultation with the community and continual improvement to its operations through this exchange of information.