KALGOORLIE CONSOLIDATED GOLD MINES

KCGM 5 Year Performance Review Report

April 2015

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1. INTRODUCTION

KCGM's Operations include the Fimiston Open Pit, Mt Charlotte Underground Mine and the Fimiston and Gidji Processing Plants. The Fimiston Operations (including Mount (Mt) Charlotte) are located adjacent to the City of Kalgoorlie-Boulder approximately 600 kilometres (km) east of Perth, Western Australia. The Gidji Operation is located approximately 17 km north of Kalgoorlie-Boulder. KCGM is the management company of the Kalgoorlie Operations for the Joint Venture Owners; Barrick (Australia Pacific) Pty Ltd (Barrick; 50%) and Newmont Asia Pacific Ltd (Newmont; 50%).

KCGM comprises many facets of mining and mineral processing including:

- Open pit mining (Fimiston);
- Waste rock disposal (Fimiston);
- Underground mining (Mt Charlotte);
- Mineral processing (Fimiston and Gidji);
- Tailings disposal (Fimiston and Gidji);
- Roasting (Gidji);
- Electrowinning and refining (Fimiston); and
- Exploration.

The KCGM Fimiston Operations include mining at the Fimiston Open Pit, and the operation of the Fimiston Processing Plant used for processing ore from the Fimiston Open Pit and from the Mt Charlotte Underground Mine. In 2009 KCGM was granted approval for the Fimiston Gold Mine Operations Extension (Stage 3) and Mine Closure Planning, allowing mining of a cutback along part of the western edge of the Fimiston Open Pit, referred to as the 'Golden Pike Cutback'. The Golden Pike Cutback brings mining closer to residential areas of Kalgoorlie-Boulder, and extended the life of the mine.

KCGM and government agencies recognise the unique situation of the Fimiston Operations being located close to the City of Kalgoorlie-Boulder, where mining has been part of the landscape for over 100 years. KCGM is committed to operating in an environmentally and socially responsible manner which will contribute to the long-term social and economic value of the Kalgoorlie area and protect the natural environment in which it operates.

KCGM has a well-established community engagement process which is an essential part of operations for one of Australia's largest gold mines, located in close proximity to a city of 30,000 people. The range of communication channels and information provided ensures that KCGM has a strong understanding of the impacts the community experiences from its operations.

KCGM's current Life of Mine (LOM) Plan has mining at the Fimiston Open Pit continuing until around 2019, and the processing of low grade stockpiles continuing until 2029. While KCGM continues to look for opportunities to extend mine life, mine closure planning is underway to ensure progressive rehabilitation, decommissioning and closure of all components of KCGM Operations.

This Five Year Performance Review Report (the Report) has been prepared by KCGM to meet the requirements of Condition 5-1 of Ministerial Statement 782 for the Fimiston Gold Mine Operations Extension (Stage 3) and Mine Closure Planning.

1.1 Purpose of the Five Year Performance Review Report

Condition 5-1 of Ministerial Statement 782 for the Fimiston Gold Mine Operations Extension (Stage 3) and Mine Closure Planning outlines the requirements in relation to this Five Year Performance Review Report:

5 Performance Review

5-1 The proponent shall submit a Performance Review report every five years after the start of mining activities forming part of the expanded and revised proposal to the Environmental Protection Authority, which addresses:

1. the major environmental issues associated with implementing the project; the environmental objectives for those issues; the methodologies used to achieve these; and the key indicators of environmental performance measured against those objectives;
2. the level of progress in the achievement of sound environmental performance, including industry benchmarking, and the use of best available technology where practicable;
3. significant improvements gained in environmental management, including the use of external peer reviews;
4. stakeholder and community consultation about environmental performance and the outcomes of that consultation, including a report of any on-going concerns being expressed; and
5. the proposed environmental objectives over the next five years, including improvements in technology and management processes.

This Report relates to the environmental performance of the Fimiston Operations, which includes mining of the Fimiston Open Pit and the operation of the Fimiston Processing Plant. This report covers the calendar year period from 2010 to 2014 to align with KCGM's annual environmental reporting. This is the first Five Year Performance Review Report that has been prepared for the Fimiston Operations.

1.2 Responsibilities and Accountabilities

KCGM is headed by a General Manager who is accountable for all of the operations' activities. There is one manager for each of the major activities of KCGM, who report directly to the General Manager. Managers are supported by superintendents, seniors, officers and operators.

During their induction, all KCGM employees and site contractors are made aware of their responsibilities and their actions which can influence the environmental performance of the operations, and for performing their jobs in accordance with environmental obligations and guidelines. Employees are supported by the Environment and Social Responsibility (ESR) Department which employs environment and community relations professionals and technical support staff.

Environmental performance criteria are built into performance assessment and review processes for KCGM's personnel and contractors. Contractor selection processes also include environmental criteria and performance records of companies tendering for work with KCGM.

1.3 Project Status

A breakdown of the Fimiston Gold Mine Operations Extension (Stage 3) and Mine Closure Plan implementation is provided in Table 1.

Table 1: Project Milestones

DATE	MILESTONE	RESPONSIBLE ORGANISATION
2009		
January	Ministerial Statement 782 published.	Minister for Environment
June	Independent Environmental Auditor appointed.	KCGM
July	1st Independent Audit Period ends (Jan 09- Jul 09)	Keith Lindbeck and Associates
July	Noise Regulation 17 Variation approved.	Minister for Environment
December	Aboriginal Cultural Heritage Management Plan (ACHMP) submitted.	DIA
2010		
January	Golden Pike Mining Proposal approved.	DMP
January	2nd Independent Audit Period ends (Jul 09- Jan 10)	Keith Lindbeck and Associates
February	ACHMP approved.	DIA
March	Noise Regulation 17 Variation Appeal dismissed.	Minister for Environment
March	Mining of the Golden Pike Cutback commenced.	KCGM
April	KCGM Mine Closure Plan (MCP) submitted.	KCGM
July	3rd Independent Audit Period ends (Jan 10 – Jul 10)	Keith Lindbeck and Associates
July	18 Month Independent Auditing Period completed. Report to Minister for Environment prepared.	Keith Lindbeck and Associates
October	Amended Noise and Vibration Monitoring and Management Plan (NVMMP) submitted.	KCGM
December	NVMMP approved.	OEPA and DER

DATE	MILESTONE	RESPONSIBLE ORGANISATION
December	A request to change the reporting dates for the Annual Audit Compliance Report (AACR) approved.	OEPA
December	The 2010 review of the Fimiston Air Quality Management Plan (FAQMP) submitted to the OEPA.	KCGM
2011		
March	4th Independent Audit Period ends (Jul 10–Mar 11).	Keith Lindbeck and Associates
March	2010 Annual Audit Compliance Report submitted to the OEPA.	KCGM
April	18 Month Auditing Report submitted to the Minister for Environment.	Keith Lindbeck and Associates
May	Submission made to the DER on the Proposed Environmental Protection (Noise) Amendment Regulations – Regulation 11 – Airblast Limits.	KCGM
June	Recommendation by the Minister for Environment that the Independent Auditor conduct two additional audits (4 and 5) to cover period until September 2011.	Minister for Environment
July	Unrestricted 24 hour mining commenced in Golden Pike .	KCGM
August	Independent Auditor requested to complete two additional audit periods.	Keith Lindbeck and Associates
August	Construction of North East Waste Rock Dumps commenced.	KCGM
September	5th Independent Audit Period ends (Apr 11 – Sep 11).	Keith Lindbeck and Associates
October	Deposition of tailings to Kaltails TSF commenced.	KCGM
December	Annual review of the FAQMP conducted.	KCGM
2012		
February	FAQMP annual review completed and submitted to the OEPA.	KCGM
March	4th Independent Environmental Auditor Report presented to the Community Reference Group. No non-compliances sighted.	Keith Lindbeck and Associates

DATE	MILESTONE	RESPONSIBLE ORGANISATION
March	DER conducted Annual Inspection of KCGM Fimiston and Gidji operations.	DER
March	2011 Annual Audit Compliance Report submitted to the OEPA.	KCGM
April	KCGM's 2012 MCP submitted.	KCGM
May	Feedback received on 2012 MCP.	DMP
May	5th and Final Independent Environmental Auditor Report presented to the Community Reference Group. No non-compliances sighted.	Keith Lindbeck and Associates
June	Response submitted to DMP on 2012 MCP.	KCGM
August	Recommendation made that no further audit periods be required for the Golden Pike Cutback and that Ministerial Conditions 782:M5.3 and 782:M5.4 be classified as "Completed" under the OEPA audit classification system.	Keith Lindbeck and Associates
August	Confirmation received from the OEPA that the requirements of conditions 5-3 and 5-4 had been satisfied and auditing is no longer required.	OEPA
September	Meeting held with DMP to discuss 2012 MCP primarily to discuss the provision of additional geotechnical information.	DMP
October	FAQMP finalised and submitted to the OEPA.	OEPA
December	A revised version of the 2012 MCP was submitted providing additional information requested by stakeholders.	KCGM
December	Meeting held with the OEPA, DER and DoH to discuss outstanding matters relating to the review of the FAQMP.	KCGM
2013		
March	KCGM advised by letter that the OEPA considers that non-compliances with Condition 9-3 (airblast levels) and 9-5 (vibration limits) of Statement 782 occurred in 2012. KCGM requested to provide a response by 30 June 2013.	OEPA
March	2012 Annual Audit Compliance Report submitted to the OEPA.	KCGM
April	DER conducted Annual Inspection of KCGM Fimiston and Gidji operations.	DER

DATE	MILESTONE	RESPONSIBLE ORGANISATION
May	KCGM requested that the OEPA consider a change to a 3 yearly submission cycle for the MCP to be consistent with tenement conditions.	KCGM
June	Additional information relating to airblast and vibration non-compliances submitted as requested by OEPA in March 2013.	KCGM
June	An application for a Noise Regulation 17 Variation was submitted seeking further approval to vary the prescribed standards.	KCGM
June	Amendments to Operating Licences for Gidji and Fimiston submitted in accordance with DER requirements.	DER
July	Notification received for the OEPA that 3 yearly submission cycle for the MCP is approved.	OEPA
August	The 2012 FAQMP and additional documents were reviewed by the OEPA and considered to satisfy Ministerial Conditions 7.1, 7.2 and 7.3.	OEPA, DER, DoH
August	Correspondence received approving a change in the timeframe for resubmission of the FAQMP from annual to every three years with the next submission due in October 2015.	OEPA
September	KCGM provided a briefing on 2013 Life of Mine and Closure Plans.	DMP
October	Site visit and familiarisation tour of KCGM Operations by senior DMP staff.	DMP
October	KCGM submitted a Works Approval to the DER for the Fimiston Emission Reduction Project.	DER
October	Desktop Audit of Ministerial Statement 782 conducted by the OEPA. KCGM in compliance with the statement.	OEPA
October	Response received from the OEPA that the non-compliances with Condition 9-3 (airblast levels) and 9-5 (vibration limits) have been resolved.	OEPA
November	Resubmission of the MCP approved by the stakeholders. OEPA now lead agency for closure coordination.	OEPA
2014		
February	KCGM announced plans that will see the operation continue to process gold until around 2029, extending open pit mining until 2019 and the mineral processing life of the mine by eight years.	KCGM
February	2013 Annual Audit Compliance Report (Ministerial Statement 782) submitted to the OEPA.	KCGM
March	Works Approval granted for the Fimiston Emissions Reduction Project.	DER

DATE	MILESTONE	RESPONSIBLE ORGANISATION
March	The *Environmental Protection (Noise) Amendment Regulations 2013* became effective on 6 March 2014. A key amendment was a reduction in airblast levels under Regulation 11 which could adversely impact on impact KCGM operations. KCGM lodged an application for approval to allow the emission of airblast to vary from the standards specified in Regulation 11, requesting that airblast levels remain at those previously set for the operation.	DER
March	Works Approval for the Fimiston II TSF Height Increment (Extension of Time) granted.	DER
March	Annual Compliance Inspection of KCGM Fimiston and Gidji operations conducted.	DER
March	KCGM celebrates 25 years of operations.	KCGM
June	The first submission of the Mining Rehabilitation Fund (MRF) data was submitted online. MRF levy now replaces the Environmental Performance Bond system.	DMP
August	Change of Proposal to Ministerial Statement 782 submitted for Fimiston II TSF Embankment Height Increase (45-60m).	OEPA
September	The Fimiston operating licence was renewed and issued to KCGM in the REFIRE format.	DER
November	Works Approval for the next Fimiston II TSF Height Increment (+3m) submitted - approved January 2015.	DER
November	Section 38 submission made to the OEPA for the Mt Charlotte Hidden Secret underground project.	KCGM
December	"KCGM: A Celebration of 25 Years" is published in recognition of 25 years of continuous operations by KCGM.	KCGM
December	KCGM met with OEPA to discuss amendments to Ministerial Statement 782 (Key characteristics table)	OEPA

2. FIMISTON OPERATIONS

The Fimiston Operations are located adjacent to the City of Kalgoorlie-Boulder (Figure 1). The operations include mining at the Fimiston Open Pit and processing at the Fimiston Processing Plant which processes ore from the Fimiston Open Pit and the Mt Charlotte Underground Mine. This section provides a brief description of these mining and mineral processing activities.

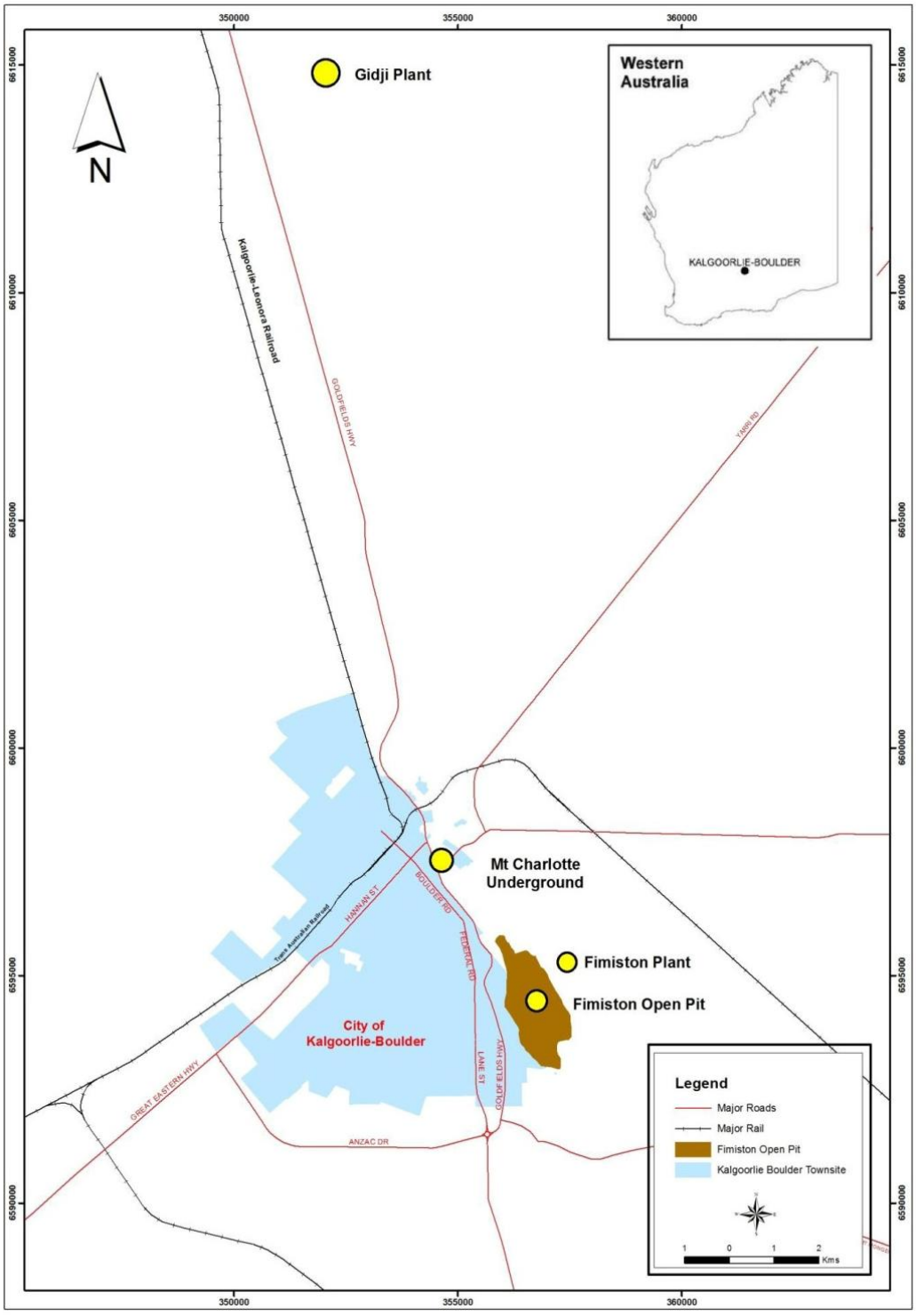

Figure 1: KCGM Operations – Location Map

2.1 Fimiston Open Pit

The Fimiston Open Pit is located on the eastern boundary of the City of Kalgoorlie-Boulder as shown on Figure 1. Mining is carried out 24 hours per day, 365 days a year.

When completed the footprint of the Fimiston Open Pit will extend approximately 3.9 km long, 1.5 km wide and up to 650 m deep. The approved Fimiston Open Pit surface footprint will enable open pit mining until 2019.

About 70 million tonnes (Mt) of ore and waste are removed from the Fimiston Open Pit each year. About 10 Mt of ore are treated at the Fimiston Processing Plant and the remaining 60 Mt of waste and low grade ore are transported to various waste rock dumps surrounding the operation. The actual tonnages of ore and waste rock mined from 2010 to 2014 for Fimiston Operations are presented in Table 2 and Figure 2.

Table 2: Fimiston Open Pit Mining Production 2010 – 2014

Period	Million Tonnes		
	Ore	Waste Rock	Total
2010	11.70	60.22	71.92
2011	13.25	59.64	72.89
2012	11.31	56.00	67.31
2013	10.53	61.68	72.21
2014	9.69	58.87	68.56
Total	*56.48*	*296.41*	*352.89*

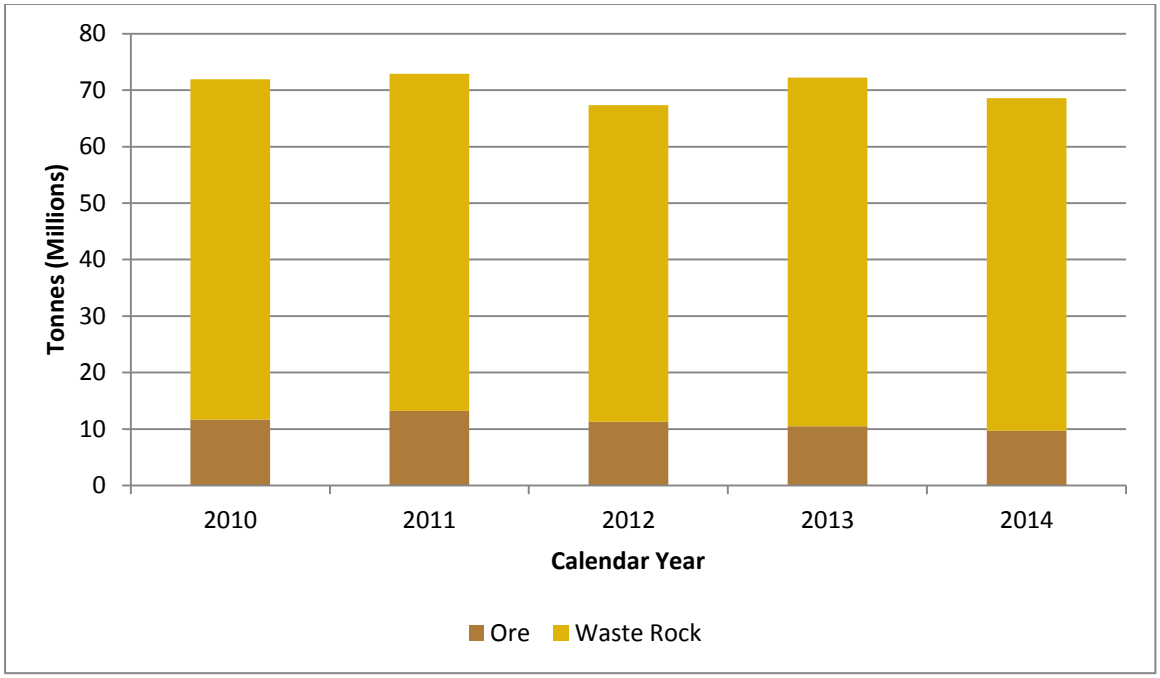

Figure 2: Fimiston Open Pit Mining Production 2010 – 2014

Mining is undertaken using hydraulic shovels that load haul trucks. These trucks transport the high-grade ore, over 1.2 grams of gold per tonne (g/t), to the Fimiston Processing Plant for processing. The low grade ore (0.9 - 1.2 g/t) is placed on separate stockpiles for later treatment and 'sub-grade' material (0.5 - 0.9 g/t) is also separated with ongoing investigations into treatment options for this material. Waste (material with less than 0.5 g/t) is trucked to the various on-site waste rock dumps. The grade of gold mined from the Fimiston Open Pit has averaged 2 g/t over this five year review period.

Drilling and blasting is undertaken to break and loosen the material for extraction by the hydraulic shovels. The blast pattern depends on the type of material being mined, either oxide material (weathered rock from near the surface), or the harder sulphide material from the lower levels. Blasting in the Fimiston Open Pit is restricted to daylight hours. However, KCGM aims to blast at regular times to maintain consistency for the community and for visitors that are often able to view blasts from the 'Super Pit Lookout'. The scheduled blast times are 1pm and/or 5pm each day; however these are regularly subject to change pending favourable wind conditions for dust management.

2.2 Fimiston Processing Plant

The Fimiston Processing Plant comprises two parallel circuits for processing refractory sulphide ore from the Fimiston Open Pit and ore from the Mt Charlotte Underground Mine.

The plant comprises:

- Two crushing circuits that supply coarse ore as a mill feed stockpile;
- Two milling circuits, the Fimiston and the Mt Charlotte. The Fimiston circuit comprises a semi-autogenous grinding (SAG) mill and a pebble crushing circuit with two secondary ball mills and four Knelson concentrators. The Mt Charlotte circuit is a single SAG mill and ball mill with a single Knelson concentrator;
- A flotation circuit and three carbon-in-leach (CIL) circuits through which milled ore is processed;
- Filtration and Ultra Fine Grind (UFG) via a carbon in leach circuit through which flotation concentrates are de-slimed and processed;
- A gold recovery circuit comprising an Acacia reactor, elution, electrowinning, smelting, pouring and production of gold bullion; and
- Tailings storage facilities (TSFs).

Gold is generally present as either free gold, within telluride minerals, locked in pyrite or silicate minerals. Ore is ground to liberate the pyrite in preparation for the ensuing processes. In the flotation circuit the gold bearing refractory sulphide is separated and referred to as concentrate. This concentrate is de-slimed, and the slimes are subjected to flotation to recover any coarse sulphide particles. The slimes flotation tailings (SFT) are treated at Fimiston in one of the CIL circuits, CIL1.

The de-slimed concentrate and slime sulphides are combined and classified into two streams. One stream is washed, filtered and transferred to Gidji for further treatment. The other stream is directed to an Ultra-Fine Grinding (UFG) circuit at Fimiston. The UFG circuit reduces the particle size of the concentrate to facilitate acceptable cyanide leach recoveries; this material is combined with the SFT. Flotation circuit tailings are further treated on site in two of the CIL circuits, CIL2 and CIL3. Final tailings are pumped to the TSFs.

The production statistics for the Fimiston Processing Plant from 2010 to 2014 are presented in Table 3 and Figure 3.

Table 3: Fimiston Processing Plant Production 2010 – 2014

Period	Million Tonnes		Million Ounces Gold Produced
	Ore Milled	Concentrate	
2010	12.15	0.43	0.79
2011	12.03	0.46	0.79
2012	11.90	0.49	0.66
2013	11.85	0.49	0.66
2014	11.62	0.50	0.67
Total	*59.55*	*2.37*	*3.57*

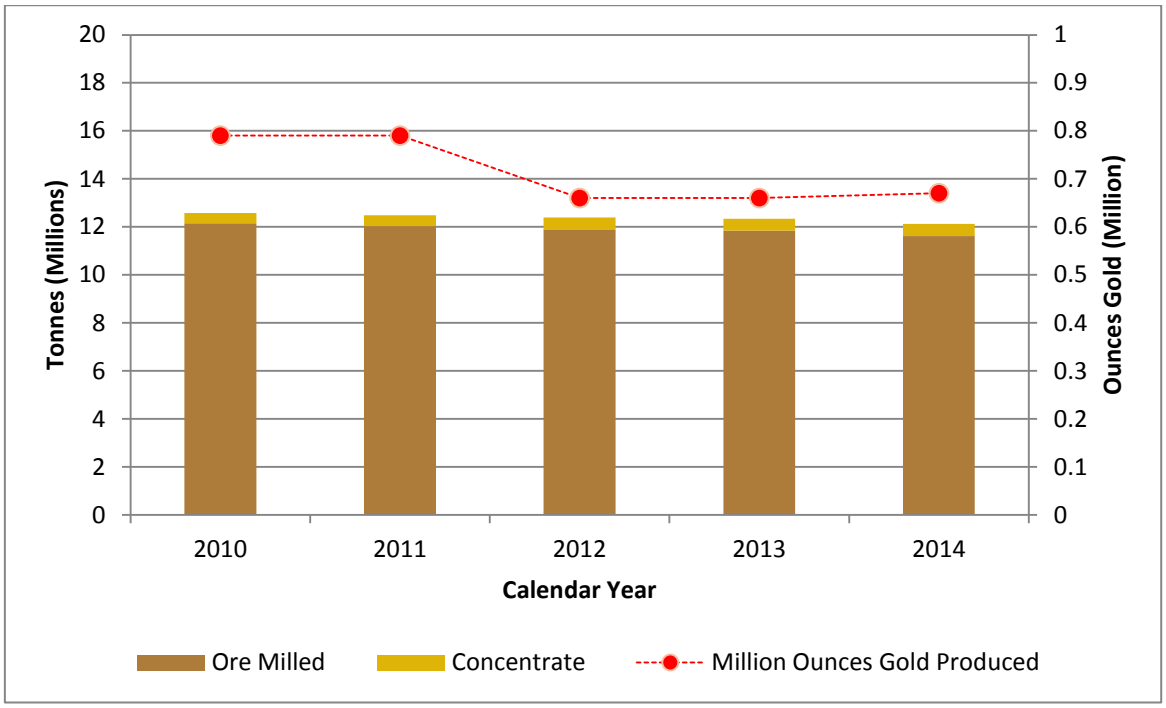

Figure 3: Fimiston Processing Plant Production 2010 - 2014

3. ENVIRONMENTAL PERFORMANCE REVIEW

KCGM manages the environmental aspects of its operations through a set of environmental management objectives, and through the implementation of Environmental Management Plans (EMPs). The EMPs detail the specific measures that are undertaken by KCGM in order to manage the key environmental aspects of its operations, as well as the monitoring programmes and key performance indicators against which performance will be measured. The key environmental aspects for the Fimiston Operations are outlined in Table 4.

Table 4: Environmental Management Objectives

Aspect	Management Objectives
Noise and Vibration	
Noise	Minimise the impact in residential areas of noise generated from KCGM's operations.
	Undertake monitoring of noise levels in residential areas near KCGM's operations.
Vibration and Airblast	Manage blasting to minimise the impact in residential areas of vibration and airblast.
	Undertake monitoring of vibration and airblast levels from blasting operations.
Air	
Dust	Manage operations in order to minimise off-site dust impacts.
	Record and quantify PM_{10} dust levels from Fimiston Operations.
Mercury	Operate the Fimiston Carbon Kilns so as to minimise the impact of mercury emissions on residential areas.
	Quantify mercury emission rates from the Fimiston Carbon Kilns.
Water	
Water	Optimise the supply and use of water so that a cost efficient, low risk, process water supply is maintained.
Energy and Emissions	
Energy and Emissions	Optimise operations to maintain or reduce pollutant emissions.
	Optimise operations to save fuel and energy, and reduce greenhouse emissions.
Rehabilitation and Closure Planning	
Rehabilitation and Mine Closure	Rehabilitate previously disturbed areas to a self-sustaining ecosystem considering visual amenity and rehabilitation materials used.
	Areas designated for revegetation will provide appropriate habitat for native fauna in keeping with the local environment and post closure land use.
	Ensure plans are in place for the continued management of the site in accordance with agreed closure criteria.

3.1 Noise, Vibration and Airblast

3.1.1 Objectives

Noise

- Minimise the impact in residential areas of noise generated from KCGM's operations.
- Undertake monitoring of noise levels in residential areas near KCGM's operations.

Vibrations and Airblast

- Manage blasting to minimise the impact in residential areas of vibration and airblast.
- Undertake monitoring of vibration and airblast levels from blasting operations.

Overview

Noise, vibration and airblast are significant environmental aspects to be managed by KCGM. Historically, residential areas have been located near KCGM and the preceding operations. Just prior to the formation of KCGM, six underground mines on the Golden Mile operated "around the clock". With the change of the mining method from underground to open pit operations, the noise environment altered.

In November 1992, Ministerial Conditions set noise-level standards for the KCGM Fimiston Open Pit operation including general noise levels and airblast standards. In 1993, following extensive study and discussion, KCGM established noise, vibration and airblast monitoring and management programmes (NVMMP) for the operation. The first version of the NVMMP was developed in 1993 to meet the requirements of Condition 5 of Ministerial Statement 188.

KCGM carried out extensive noise assessment and modelling work to determine the best means of reducing nuisance noise from the Fimiston Operations. The results of the modelling work indicated that an earthen bund between the Fimiston Open Pit and Kalgoorlie-Boulder would significantly reduce nuisance noise. The first stage of the environmental noise bund was constructed using waste rock in 1993 with other minor modifications undertaken between 1999 and 2001.

KCGM revised its NVMMP in June 2004, as part of the approval process for the Southern Landform Extension Project, which included a major southern extension of the noise bund. In 2006, an application for a realignment of the noise bund was approved for the Golden Pike Cutback with construction commencing in June 2007.

Construction of the realignment, which extends for two and a half kilometres, was completed in January 2011. Rehabilitation earthworks on the realignment that commenced in July 2011 were completed during May 2012 with seeding completed by September 2012. The Environmental Noise Bund now extends for a total distance of six kilometres along the western edge of the Fimiston Open Pit.

The NVMMP was revised in April 2009 and submitted to meet the requirements of Clause 8 of the Environmental Protection (Fimiston Gold Mine Noise Emissions) Approval 2009 (NR17V) and Ministerial Statement 782: Condition 9-6.

In July 2009, the application for the NR17V was approved and published in the Government Gazette. The Office of the Environmental Protection Authority's (OEPA) Audit and Verification Report (March 2010) indicated that the 1992 Noise Level Standards have now been superseded by the NR17V in accordance with Ministerial Statement 782: Condition 8.

The NVMMP was revised in April 2010 to incorporate recommendations of the Appeals Committee regarding one appeal against the NR17V; and feedback from the DER. The current version of the NVMMP (October 2010) was submitted to the OEPA and the DER on 19 October 2010. The NVMMP was subsequently approved by the OEPA on 6 December 2010.

In 2013 a number of minor changes were made and approved by the DER on 21 June 2013. These changes were:

- Change of field calibration from weekly to monthly following the replacement of the continuous noise monitoring equipment (RTA02 monitors upgraded to B&K2250 monitors); and
- Continue to record noise trigger events but they will only be analysed on an as needs basis and will no longer form part of the Quarterly Noise and Blast Report from Q2 2013.

The 2009 approval is valid for 5 years (13 July 2014) or if KCGM applies for a further approval within the first four years, it will continue to operate until another approval is granted or refused. On 21 June 2013 KCGM submitted a re-application for the Noise Regulation 17 Variation.

KCGM has been advertising noise monitoring results in the Kalgoorlie Miner newspaper each quarter since 1993. The advertisement also provides details regarding how people can obtain further information regarding KCGM's noise management or how to contact the operation with specific noise-related concerns or queries. A PDF copy of these quarterly advertisements can be found on the KCGM web site www.superpit.com.au.

KCGM conducts environmental noise, blast vibration and airblast monitoring to measure performance in terms of compliance with the approved standards, and the effectiveness of its management strategies. The noise and blast monitoring results obtained during this five year review period have been evaluated as a key indicator of performance.

3.1.2 Environmental Noise Monitoring

KCGM undertakes both compliance and continuous environmental noise monitoring programmes.

The compliance noise monitoring is conducted at five reference locations, Boulder Primary School (BPS), Baron Street Williamstown (BSW), Kalgoorlie Technical School (KTS), York Street Boulder (YSB) and Outram Street Boulder (Figure 4). Continuous noise monitoring is conducted at KTS and at BPS.

Figure 4: Noise Monitoring Site Locations

3.1.3 Compliance Monitoring

Since Quarter 3 2009, KCGM has undertaken noise monitoring to determine compliance with the approved noise standards. Compliance noise monitoring is undertaken each quarter by specialist noise consultants during the evening and/or night periods to minimise the sources of contributing noise other than mining (i.e. traffic), and also as it represents the time of day that Kalgoorlie-Boulder residents are likely to be most affected by mining noise from the Fimiston. These results have been provided to the DER and OEPA in the Quarterly Noise and Blast Reports and to the community in the newspaper advertisements and via the KCGM website.

For the 2010-2014 review period the noise levels measured at the five reference locations have all complied with the approved noise levels for the evening/night time period (Figure 5). During this five year review period, the compliance monitoring programme measured noise levels above the approval noise standards on two occasions at BSW reference location during the second and third quarters of the 2010 compliance monitoring programmes. Analysis of the data concluded that these noise levels were mostly influenced by a continuous industrial noise source in the area and were not related to the Fimiston Operations.

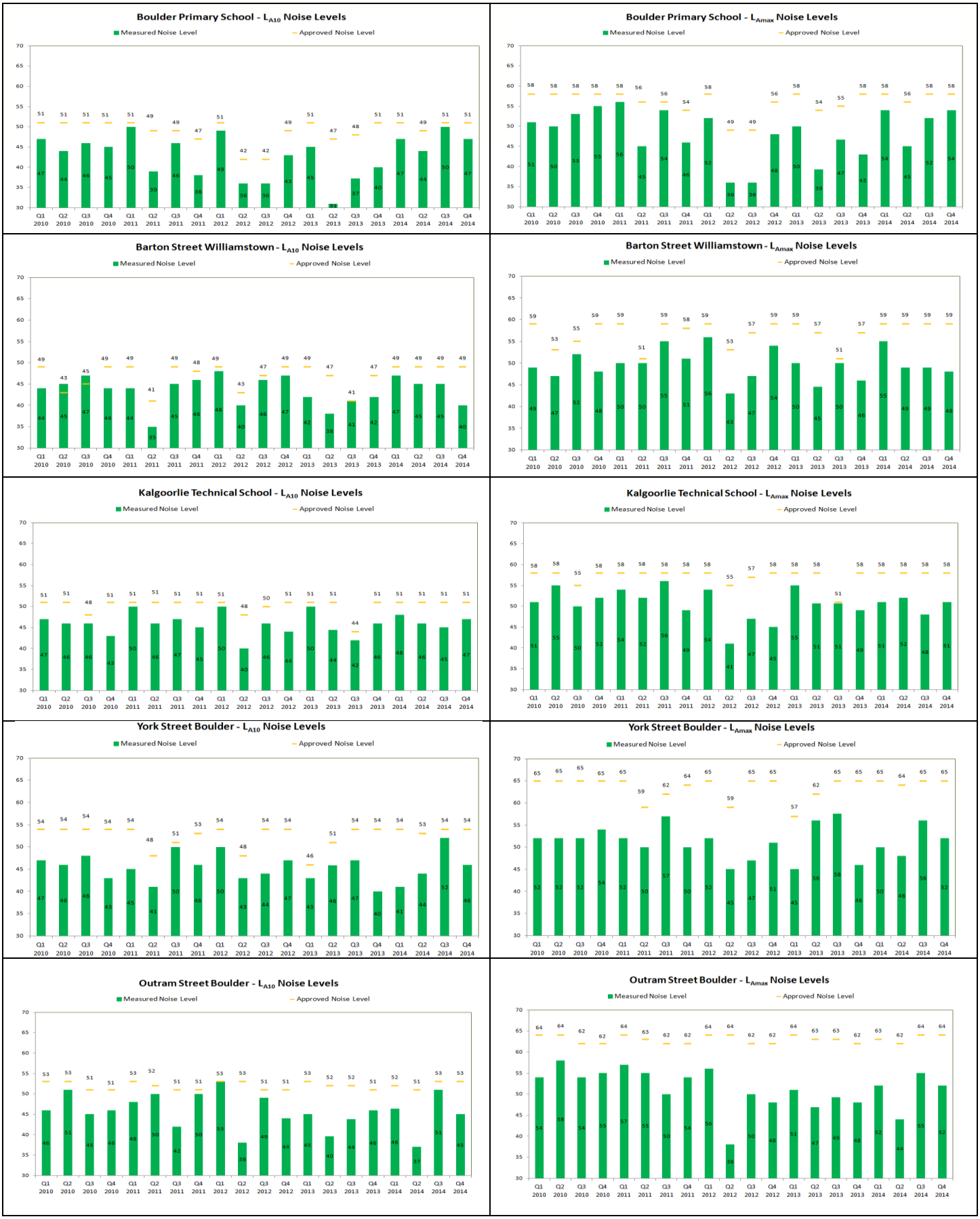

Figure 5: Compliance Noise Monitoring 2010 -2014

3.1.4 Continuous Monitoring

Continuous noise monitoring has also been conducted at KTS and BPS over this five year review period. The continuous noise monitoring data at these locations is influenced by other noise sources such as traffic and social activity and does not only represent noise emission levels from the Fimiston Operations. Therefore it is not a reliable indicator for determining compliance with the approved noise levels. The continuous noise monitoring data does however provide a reference for the comparison of noise levels over time.

The trend in the continuous noise monitoring data recorded at KTS and BPS over this five year review period indicates that noise at these sites, although significantly affected by the weather conditions, has remained relatively stable. Table 5 presents the average annual L_{10}, L_{50} and L_{90} noise levels recorded from July 2009 to June 2014 for the evening (19:00 – 22:00 hours) and night-time (22:00 – 07:00 hours) periods.

Table 5: Continuous Noise Monitoring – Annual Average Noise Levels (dB)

Monitoring Period	Boulder Primary School			Kalgoorlie Technical School		
	L_{10}	L_{50}	L_{90}	L_{10}	L_{50}	L_{90}
Evening Annual Average Noise Levels						
2009/2010	57	51	50	62	52	49
2010/2011	57	52	51	60	51	49
2011/2012	57	52	51	57	53	52
2012/2013	51	45	43	55	47	43
2013/2014	53	46	43	56	47	43
Night-time Annual Average Noise Levels						
2009/2010	53	50	49	54	49	48
2010/2011	54	52	51	55	53	51
2011/2012	55	52	51	55	53	51
2012/2013	50	45	42	51	45	42
2013/2014	52	46	43	54	46	43

The reduction in average noise levels in the 2012/2013 monitoring period is directly related to the replacement of the Sound Level Meters with more up-to-date technology in late 2011. Therefore the 'current' annual average noise levels, measured during 2013/2014, can only be compared to that of the previous annual monitoring period (2012/2013). In comparing the annual average noise levels, it should also be noted that the noise from the Fimiston Operation is very constant and stable, and hence the L_{90} or L_{50} levels are more representative, rather than L_{10} values.

From the noise monitoring data presented in Table 5 it can be seen that the annual average L_{90} or L_{50} levels measured during 2013/2014 have increased slightly compared to the previous annual monitoring period. Between the 2009/2010 and 2011/2012 annual reporting periods, prior to the replacement of the Sound Level Meters, annual average L_{90} or L_{50} levels also increased slightly. It should also be noted that KCGM's Fimiston Operations did not necessarily result in the increased noise levels and that these increases could be associated with an increase in local traffic or other activities.

Through the implementation of the Noise and Vibration Monitoring and Management Programme, KCGM has identified the activities and equipment that are the more significant noise sources and has developed methods for minimising their impact. This has enabled KCGM to extend the Fimiston Open Pit mining operations within the Golden Pike Cutback whilst maintaining compliance with the approved noise standards. KCGM continues to explore measures to further reduce noise emissions.

3.1.5 Noise Management and Improvements

Following any high noise levels measured during compliance monitoring or public feedback, KCGM reviews the conditions surrounding the event and where appropriate, refines management practices to endeavour to minimise the likelihood of a recurrence of such an event.

Over time KCGM has found that during winter months noise levels can be higher than summer months due to the influences of weather conditions (rather than through any change to the mining operation). KCGM is committed to continual improvement to reduce the impact of noise from its operations. Any outcomes from investigations are implemented when identified and practicable. Further detail regarding public complaints is contained in Section 5.2.

The Environmental Protection (Fimiston Gold Mine Noise Emissions) Approval 2009 (Approval) was published in the Western Australian Government Gazette on the 14 July 2009. This Approval granted KCGM permission to allow the level of noise emitted from the Fimiston Operations to vary from the prescribed standard and outlined other clauses which are to be complied with. Clause 10 of the Approval requires KCGM to submit an annual report to the Director of the Environmental Regulation Division, DER, prior to the 14 of August each year.

To satisfy Clause 10, KCGM produces the Annual Noise Monitoring and Management Report (ANMMR). The scope of this report is, however, not restricted to the specific requirements of Clause 10 and other areas are included for completeness in order to ensure all parties are generally informed of KCGM's noise monitoring and management programmes. The report includes:

- A history of noise approvals;
- Noise monitoring summaries;
- Noise management activities; and
- Public complaints regarding noise.

Extensive review and assessment of performance was provided to the DER for consideration in the Noise Regulation 17 Variation.

Specific improvement measures implemented by KCGM to minimise the impact of the Fimiston Operation on noise in residential areas have included:

- Construction of the Environmental Noise Bund Realignment for the Golden Pike Cutback to minimise noise impacts upon the residents of Kalgoorlie-Boulder;
- Construction of a new noise bund along the northern edge of the waste landform to minimise the potential noise impacts upon the residents of Williamstown;
- The use of ‘Sound-Tainers’ (Figure 6) for resource definition drilling that occurs in close proximity to residential areas;
- Installation of broadband reversing alarms on all mobile equipment permanently located onsite at the Fimiston Operations (with the exception of the PC8000 Shovels), effective in reducing environmental noise levels as the sound attenuates more with distance such that not only are the overall dB(A) noise levels lower, but also the tonality is not present;

- Existing haul trucks were retrofitted with quieter engines during 2002, and new haul trucks purchased since this time have quieter engines as standard. Six-monthly noise monitoring of individual Caterpillar 793 haul trucks is also conducted to enable analysis of noise performance trends and identify if additional maintenance is required;
- Lights were fitted to the Letourneau Loader and are used at night to indicate when loading is complete, replacing the need to use the horn during the evening and night time periods; and
- Collaboration with the University of Western Australia (UWA) to develop an integrated passive and active noise control system for attenuating the low frequency noise from haul trucks.

Figure 6: Photograph of 'Sound-Tainer' Used for Noise Attenuation

3.1.6 Airblast Monitoring

Routine blast monitoring for Fimiston Open Pit blasts was established in 1993 as part of the NVMMP. KCGM monitors airblast at six reference locations between the Open Pit and Kalgoorlie-Boulder (Figure 7). A blast event is recorded if a vibration trigger level of 0.2 mm/sec is exceeded for any of the blast monitor geophones.

The Environmental Protection (Noise) Regulations 1997 were amended and gazetted on the 5 December 2013 as the *Environmental Protection (Noise) Amendment Regulations 2013*. KCGM lodged an application on 6 March 2014 for approval to allow the emission of airblast to vary from the standards specified in Regulation 11.

Airblast monitoring results since 6 March 2014 are compared to the current standards set out in the *Environmental Protection (Noise) Regulations 1997*. Airblast monitoring results for the 2010 to 2013 calendar period are compared to the historic standards, as set out in NVMMP.

Figure 7: Airblast and Vibration Monitoring Locations

Table 6 presents a summary of the current standards for airblast levels under Regulation 11 of the *Environmental Protection (Noise) Regulations 1997*, and the historic standards as set out in the approved Noise and Vibration Monitoring and Management Programme.

Table 6: Summary of Regulated Airblast Level Standards

Day and Time	Location		Blast Frequency	Airblast Level
Current Standards (from 6 March 2014)				
0700 to 1800 hours Any Day	noise sensitive premises	sensitive site [1]	No blast *greater than*	120 dB $L_{Z\ peak}$
			9 in any 10 consecutive blasts *less than*	115 dB $L_{Z\ peak}$
		non sensitive site [2]	No blast *greater than*	125 dB $L_{Z\ peak}$
			9 in any 10 consecutive blasts *less than*	120 dB $L_{Z\ peak}$
	any other premises		No blast *greater than*	125 dB $L_{Z\ peak}$
			9 in any 10 consecutive blasts *less than*	120 dB $L_{Z\ peak}$
1800 to 0700 hours Any Day[3]	any premises		No blast *greater than*	90 dB $L_{Z\ peak}$
Historic Standards				
0700 to 1800 hours Monday to Saturday	any premises		No blast *greater than*	125 dB $L_{Linear\ peak}$
			9 in any 10 consecutive blasts *less than*	120 dB $L_{Linear\ peak}$
0700 and 1800 hours Sunday or Public Holiday	any premises		No blast *greater than*	120 dB $L_{Linear\ peak}$
			9 in any 10 consecutive blasts *less than*	115 dB $L_{Linear\ peak}$
1800 to 0700 hours Any Day[3]	any premises		No blast *greater than*	90 dB $L_{Linear\ peak}$

Notes:
1. Alpha, Bravo, Charlie, and Delta reference locations are classified as "sensitive site".
2. Echo and Foxtrot reference locations are classified as "non-sensitive site".
3. Except where blasting is in accordance with Regulation 8.28(4) of the *Mines Safety and Inspection Regulations 1995*, levels apply as appropriate for the time when it was intended for the blast to be fired.

A summary of the results of airblast monitoring for this five year review period is presented in Table 7. During this five year review period, airblast levels above the relevant limits were measured on three occasions, occurring on 14 November 2011, 13 February 2012, and most recently on 10 January 2014. Each of these events occurred following a blast within the Golden Pike Cutback.

A non-compliance incident related to the 'one in every ten' requirement also occurred during 2012, involving elevated blast airblast levels on the 8 and 15 October 2012. KCGM conducted a detailed investigation into each of these blasting events to identify the likely cause of the elevated readings, and to identify measures to minimise the likelihood of recurrence. This information is reported to the OEPA in the quarterly Noise and Blast Monitoring Reports and the relevant Annual Audit Compliance Report. Each of these events, their contributing factors and the corrective mitigation actions implemented have been reviewed by the OEPA and notification of the review outcome provided back to KCGM. On each occasional KCGM has been notified by the OEPA that the corrective mitigating actions undertaken appear to be effective in mitigating further occurrences under similar conditions.

Table 7: Summary of Airblast Monitoring Results

Monitoring Period	Airblast Level (dB L)	Monitor Location					
		Alpha	Bravo	Charlie	Delta	Echo	Foxtrot
2010	≤115	227	236	220	202	184	178
	115.1 – 119.9	-	1	-	1	4	-
	120 – 124.9	-	-	-	-	1	-
	≥125	-	-	-	-	-	-
	Trigger Events	227	237	220	203	189	178
2011	≤115	230	233	236	205	180	185
	115.1 – 119.9	4	3	4	2	2	3
	120 – 124.9	2	-	-	2	-	-
	≥125	-	**1** [1]	**1** [1]	-	-	-
	Trigger Events	236	237	241	209	182	188
2012	≤115	290	263	268	219	187	81
	115.1 – 119.9	7	6	13	7	1	-
	120 – 124.9	1	**1** [2]	**3** [2]	-	-	-
	≥125	**1** [3]	**1** [3]	-	-	-	-
	Trigger Events	299	271	284	226	188	81
2013	≤115	303	238	297	204	256	223
	115.1 – 119.9	5	4	9	3	1	-
	120 – 124.9	-	-	2	1	-	1
	≥125	-	-	-	-	-	-
	Trigger Events	308	242	308	208	257	224
2014	≤115	326	290	317	258	279	131
	115.1 – 119.9	4	4	2	1	-	-
	120 – 124.9	-	-	1	1	-	-
	≥125	-	-	-	-	**1** [4]	-
	Trigger Events	330	294	320	260	280	131
Total	Trigger Events	1400	1281	1373	1106	1096	802

Notes:
1. Measured on 14 November 2011. 125.7 dB L (Bravo) and 127.8 (Alpha).
2. Measured on 8 and 15 October 2012. 120.1 dB L (Bravo) and 120.6 dB L (Charlie).
3. Measured 13 February 2012. 129.7 dB L (Alpha) and 125.2 dB L (Bravo).
4. Measured 10 January 2014. 126.2 dB L (Echo).

The trend in airblast over this five year review period is shown in Figure 9 as the number of trigger events that exceeded a threshold of 115 dB L blast airblast. The 115 dB L is not a regulatory standard, but rather has been selected as a suitable threshold for evaluating the trend in blast airblast levels measured over this five year review period.

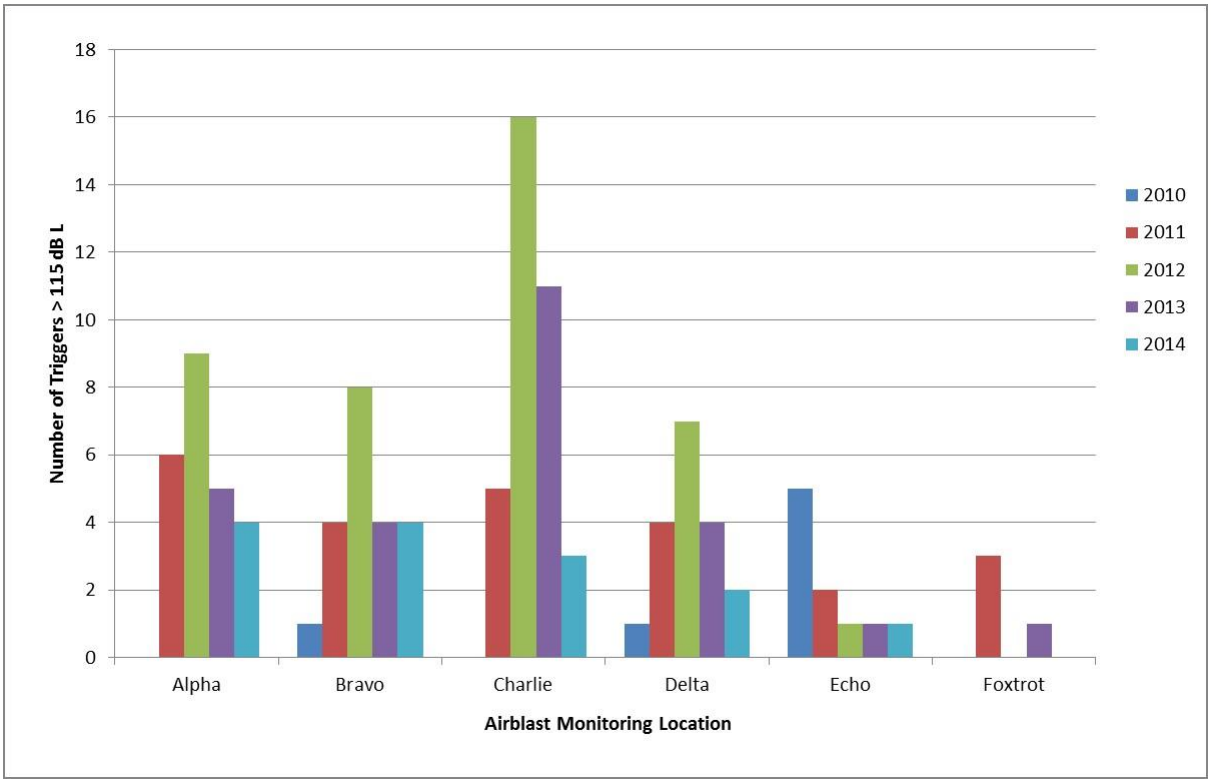

Figure 8: Number of Airblast Trigger Events Exceeding 115 dB L

The data presented in Figure 8 shows that the number of airblast trigger events exceeding the 115 dB L level has steadily declined since the peak that occurred in 2012 at the Alpha, Bravo, Charlie and Delta monitoring locations. Similarly, the number of airblast trigger events exceeding the 115 dB L level at the Echo and Foxtrot monitoring site has declined since the peak that occurred in 2010 (Echo) and in 2011 (Foxtrot). The decline in the number of events exceeding the 115 dB L level shows that the measures implemented by KCGM have resulted in measureable improvements in airblast impacts.

3.1.7 Vibration Monitoring

KCGM monitors ground vibration due to blasting at six reference locations between the Fimiston Open Pit and Kalgoorlie-Boulder (Figure 7). Vibration caused by a blast is recorded when ground vibration exceeds the set trigger level of 0.2 mm/sec, and is referred to as a blast "trigger event".

The approved vibration levels due to blasting are set out in Condition 9-5 of Ministerial Statement 782 for the Fimiston Operations (Table 8). Vibration is measured as peak particle velocity (ppv), in units of mm/sec.

Table 8: Summary of Approved Vibration Limits

Blast Frequency	Vibration Limit
9 in any 10 consecutive blasts less than	5 mm/sec
No blast greater than	10 mm/sec
90% of blasts per year less than	5 mm/sec

A summary of the results of vibration monitoring for this five year review period is presented in Table 9. During this five year review period, blast vibration levels above the approved limits were measured on three occasions, occurring as a result of blasts conducted on the 7 and 8 October 2012, 20 and 25 October 2012 and 30 June and 3 July 2014. On each occasion two blasts above the standard occurred within ten consecutive blasts in the Golden Pike Cutback. KCGM conducts detailed investigations into each of these blasting events to identify the likely cause of the elevated readings, and to identify measures to minimise the likelihood of recurrence.

The results of the investigations are reported to the OEPA in the quarterly Noise and Blast Monitoring Reports and the relevant Annual Audit Compliance Report. Each of these events, their contributing factors and the corrective mitigation actions implemented have been reviewed by the OEPA and notification of the review outcome is provided back to KCGM. On each occasional KCGM has been notified by the OEPA that the corrective mitigating actions undertaken appear to be effective in mitigating further occurrences under similar conditions.

Table 9: Summary of Blast Vibration Monitoring Results

Monitoring Period	Vibration (ppv)	Monitor Location					
		Alpha	Bravo	Charlie	Delta	Echo	Foxtrot
2010	<2.0	227	230	220	201	184	178
	2.0 – 4.9	-	7		2	5	-
	≥5.0	-	-	-	-	-	-
	Trigger Events	227	237	220	203	189	178
2011	<2.0	211	185	207	203	180	188
	2.0 – 4.9	25	50	34	6	2	-
	≥5.0	-	2	-	-	-	-
	Trigger Events	236	237	241	209	182	188
2012	<2.0	244	132	193	220	188	81
	2.0 – 4.9	54	120	89	5	-	-
	≥5.0	1	**19** [1,2]	**2** [1]	1	-	-
	Trigger Events	299	271	284	226	188	81
2013	<2.0	184	69	206	202	255	219
	2.0 – 4.9	119	157	102	6	1	4
	≥5.0	5	16	-	-	1	1
	Trigger Events	308	242	308	208	257	224
2014	<2.0	226	95	196	241	280	129
	2.0 – 4.9	101	181	124	19	-	2
	≥5.0	3	**18** [3]	-	-	-	-
	Trigger Events	330	294	320	260	280	131
Total	Trigger Events	1400	1281	1373	1106	1096	802

Notes:
1. Measured on 7 and 8 October 2012. 5.464 mm/sec (Bravo) and 6.298 mm/sec (Charlie)
2. Measured on 20 and 25 October 2012. 5.627 mm/sec (Bravo) and 8.810 mm/sec (Bravo)
3. Measured on 30 June and 3 July 2014. 5.353 mm/sec (Bravo) and 5.191 mm/sec (Bravo)

The trend in blast vibration over this five year review period is shown in Figure 9 as the percentage of trigger events greater than or equal to 5.0 mm/sec. The approved vibration limits due to blasting set out in Condition 9-5 of Ministerial Statement 782 include a requirement that no more than 10% of blasts per year result in vibration levels of 5 mm/sec or greater.

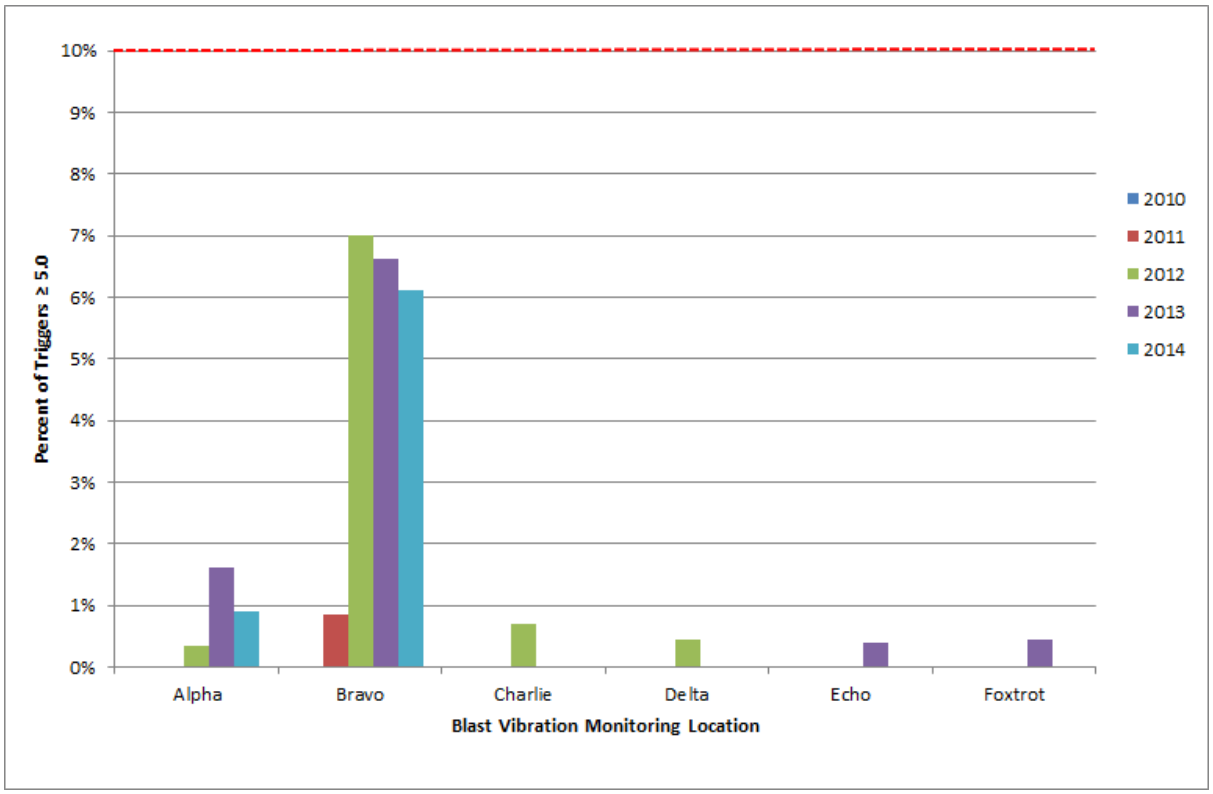

Figure 9: Percent of Blast Vibration Trigger Events ≥ 5.0 mm/sec

The data presented in Figure 9 shows that the percentage of blast trigger events with a vibration level of 5.0 mm/sec or greater has remained well within the approved 10% annual occurrence requirement. The highest occurrence of blast trigger events with a vibration level of 5.0 mm/sec or greater were recorded at the Bravo monitoring site. The occurrence of blast trigger events with a vibration level of 5.0 mm/sec or greater recorded at the Bravo monitoring site has steadily declined since the peak that occurred in 2012, indicating a measureable improvement in vibration impacts at this monitoring site.

3.1.8 Blast Management

KCGM has developed and implemented an airblast and vibration control strategy to minimise the impacts from its mining activities. The strategy ensures compliance with relevant standards and is based on recommendations of specialist consultants and past experience. The key components of the strategy include:

- Restricting blasting times to daylight hours (between 07:00 and 18:00 hours) and on most occasions occurs at a publicised time each day (generally 13:00 or 17:00 hours). Whenever possible, explosives placed for surface blasts are fired when weather conditions are such that the impact of airblast and dust emissions on residential areas of Kalgoorlie-Boulder are minimised;
- Avoiding blasting on Sundays where possible. Sunday blasts are not included in the fortnightly production schedules and any Sunday blasts fired are reported in the OEPA Noise and Blast Monitoring Quarterly Reports;

- Internal procedures and training for blasting to ensure that the quality of the blast design and set up is within the set guidelines;
- Implementing a quality assurance (QA) system of continuous measurement and review of drilling, charging and firing practices to ensure the best possible outcomes from a blast. KCGM has completed several QA studies measuring every aspect of drilling and charging. The studies have revealed that the more intense the QA, the more accurate is the drill and blast process; and
- Selection of competent personnel and subsequent supervision to overcome the 'human factor' in the implementation of procedures and encouragement of a professional culture within the respective drilling and blasting crews. Any blasts which exceed the KCGM internal limits is fully investigated and notification is provided to the people responsible for preparing the blast.

KCGM has also been proactive in research and development in less invasive blasting techniques while still achieving the mining outcomes required. Initiatives include:

- The 'near field' vibration study to further understanding of how the rock behaves when subject to the pressure waves of a blast and 'fine tune' blasting methods to minimise blasting vibration;
- Continued research into the use of electronic detonators, driven in part from the perceived environmental benefits (reduced vibration) of extremely accurate timing that is 'customised' for particular ground conditions;
- Studies of 'domain blasting' where the rock strength is predicted by examining the penetration rate of drills or studying the geology of the area. The aim of the exercise is to have a formal prediction process that prevents weaker rock areas being overcharged, which can lead to elevated airblast levels; and
- Use of a high speed camera capable of showing blasts in one two-thousandth of a second frames to provide a better understanding of what processes are leading to unfavourable events within blasts.

Sunday Blasting

Condition 9-4 of Ministerial Statement 782 requires that KCGM make all reasonable efforts to avoid blasting on Sundays. However, blasting may occasionally occur on Sundays if production schedules or safety requirements and weather conditions (e.g. lightning in close proximity to the operations) have delayed firing of shots on previous days.

There were a total of 35 blasts fired on a Sunday during this five year review period; seven in 2010, one in 2011, nine in 2012, nine in 2013 and nine in 2014.

In relation to Condition 9-4, KCGM has implemented the following measures to ensure all reasonable measures are made to avoid blasting on Sundays:

- Sunday blasts are not included in the fortnightly production schedules;
- Any Sunday blasts fired require an appropriate level of approval; and
- Sunday blasts are reported on a quarterly basis in the Noise and Blast Monitoring Quarterly Reports, with efforts taken to avoid each Sunday blast documented.

3.2 Air Quality

3.2.1 Objectives

Dust

- Manage operations in order to minimise off-site dust impacts.
- Record and quantify PM_{10} dust levels from Fimiston Operations.

Mercury

- Operate the Fimiston Carbon Kilns so as to minimise the impact of mercury emissions on residential areas.

Overview

The major air quality issues for the Fimiston Operations have related to the management of dust emissions from the mining operations, and mercury emissions from the Fimiston Processing Plant. As part of the Fimiston Air Quality Management Plan (FAQMP) KCGM has developed a number of management programmes to address these air quality issues, including a Blasting Dust Management Programme (BDMP), Dust Monitoring and Management Programme (DMMP), Carbon Kiln Mercury Emissions Reduction Programme (CKMERP) and Mercury and Nickel Ambient Monitoring Programme (MNAMP).

While each of these programmes are managed separately due to their different requirements and areas of application, the FAQMP ensures they are managed within a consistent and integrated framework. KCGM believes the FAQMP provides best practices and procedures to enable the Fimiston Operations to continue in a reasonable and practicable manner, while providing an acceptable air quality environment for the residents of the City of Kalgoorlie-Boulder.

3.2.2 Dust Monitoring

KCGM's Dust Monitoring and Management Programme (DMMP) has been developed and implemented by KCGM in accordance with conditions set by the Minister for Environment since the early 1990's. The first version of the DMMP was developed in 1993 to meet the requirements of Condition 5 of MS:188.

The DMMP was subsequently revised in 2001 to reflect blasting dust monitoring and management changes and again 2004 to meet requirements of the Southern Landform Extension Project Section 45C Approval.

The Fimiston Air Quality Management Plan (FAQMP) was initially developed by KCGM in 2007 as part of the Fimiston Gold Mine Operations Extension (Stage 3) and Mine Closure Planning Public Environmental Review (PER) to integrate a number of management plans that cover various air quality aspects of the Fimiston Operations, including the DMMP.

The 2012 FAQMP review was submitted in December 2012 in accordance with Ministerial Statement 782 and approved by OEPA on the 14 August 2013. No amendments were made to the DMMP in the 2012 FAQMP review. The approval did however alter the FAQMP review cycle from annual to a three yearly cycle commencing October 2012. However it should be noted substantial changes to the FAQMP that would affect management actions or targets, would require a resubmission of the FAQMP.

The major sources of dust emissions associated with the Fimiston Operations include drilling and blasting; loading and unloading of ore and waste rock; vehicle generated dust; wind erosion; crushing; and conveying.

There are also 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 uses data from its dust monitoring network (seven continuous PM_{10} monitors and two wind speed and direction monitors) to assess the potential contribution of mining operations to any elevated concentrations.

KCGM undertakes continuous PM_{10} monitoring at the Hannan's Golf Course (HGC), Boulder Shire Yard (BSY), Hewitt Street (HEW), Clancy Street (CLY), Hopkins Street (HOP), Mt Charlotte (MTC) and Metals Exploration Yard (MEX) sites (Figure 10). The MTC and MEX PM_{10} monitors are located near existing wind speed and wind direction monitoring stations. The HGC site is primarily used as a control/background monitoring site for PM_{10} as it is located some 4.5 km from the Fimiston Operations. It is considered to be representative of the local environment and data enables comparison of background levels with the other monitoring sites.

The data is used to generate 24-hour average concentrations for comparison against the National Environmental Protection (Ambient Air Quality) Measure (NEPM) PM_{10} standard of 50 µg/m^3. The NEPM standard for PM_{10} also specifies an ambient objective of a maximum of five days per annum above 50 µg/m^3 for the 24-hour average per monitoring site. The 24-hour average PM_{10} concentrations measured at each site are contained in the KCGM Dust Monitoring Report which is available on the KCGM website (www.superpit.com.au) within 24 hours of the data being recorded. The provision of the KCGM Dust Monitoring Report meets the requirements of Condition 7.5 of Ministerial Statement 782.

The data from PM_{10} monitors, in combination with the wind data are used to identify the potential sources 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 rather than KCGM specific sources.

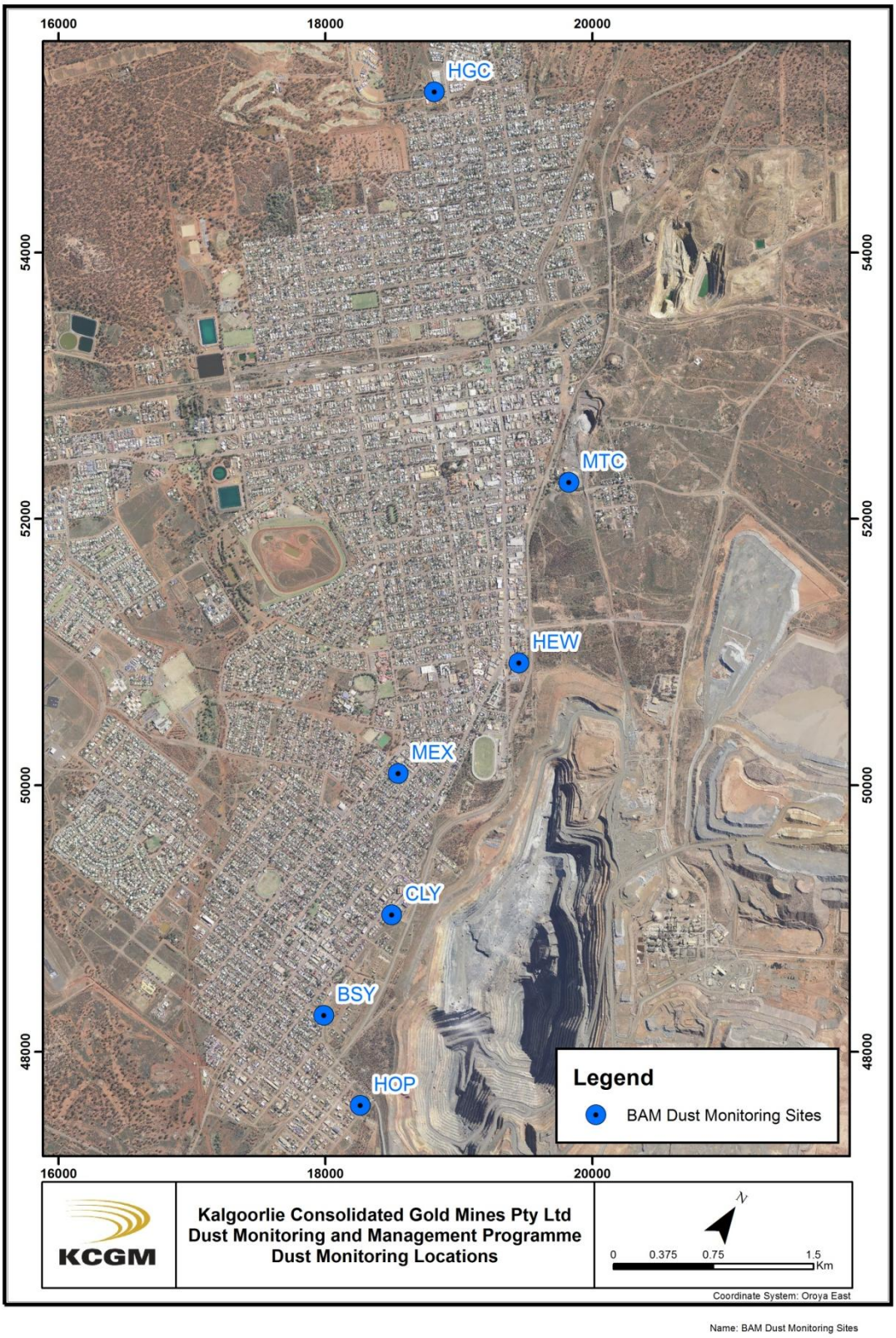

Figure 10: Ambient Dust Monitoring Locations

In the event that there is an exceedance of the 24-hour PM_{10} NEPM standard at any site, KCGM undertakes a review and assessment of the monitoring data at that site to determine the validity of the data and the concentration associated with the KCGM aligned wind arc. A comparison of the measured data is then made against the data recorded at the nominated background site to determine KCGM's likely contribution to the recorded 24-hour average concentration. KCGM is considered to be a significant contributor when its potential contribution is determined to be greater than 60% of the recorded 24-hour PM_{10} concentration. Where KCGM is considered to be a significant contributor, further assessment is undertaken to identify the likely source of dust (i.e. mining operations, vehicle movements and/or wind erosion). KCGM report the findings of these assessments to the DER, OEPA and DoH and corrective actions arising from these assessments are recommended where appropriate.

A summary of the 24-hour average dust monitoring events above 50 µg/m^3 for this five year review period is presented in Table 10. The PM_{10} NEPM objective of a maximum of five days per annum above 50 µg/m^3 for the 24-hour average was exceeded at three sites during 2010, 2012 and 2013; at a single site in 2011; and at two sites in 2014. KCGM was not considered to be a significant contributor to the majority of these events and is in compliance with the NEPM Standard for the period 2012 - 2014. Figure 11 shows the dust monitoring locations which exceeded 50 µg/m^3 for the 24-hour Average in 2010 – 2014.

Table 10: Dust Monitoring Events above 50 µg/m^3 for the 24-hour Average

Monitoring Period	Number of 24-hour Average PM_{10} Concentrations Above 50 µg/m^3 [1]						
	HGC[2]	BSY	HEW	CLY	HOP	MTC	MEX
2010	2	9 **(2)**	6	6	2	2	1
2011	1	7 **(3)**	2	3	2	1	1
2012	8 **(0)**	22 **(2)**	4 **(0)**	4 **(0)**	6 **(2)**	1 **(0)**	0
2013	1 **(0)**	7 **(2)**	4 **(1)**	13 **(5)**	7 **(3)**	0	0
2014	0	3 **(2)**	1 **(1)**	13 **(4)**	10 **(3)**	0	1 **(0)**

Notes:
1. The value in brackets represents the number of occasions KCGM was identified as a primary contributor to the dust events.
2. Designated control/background site.

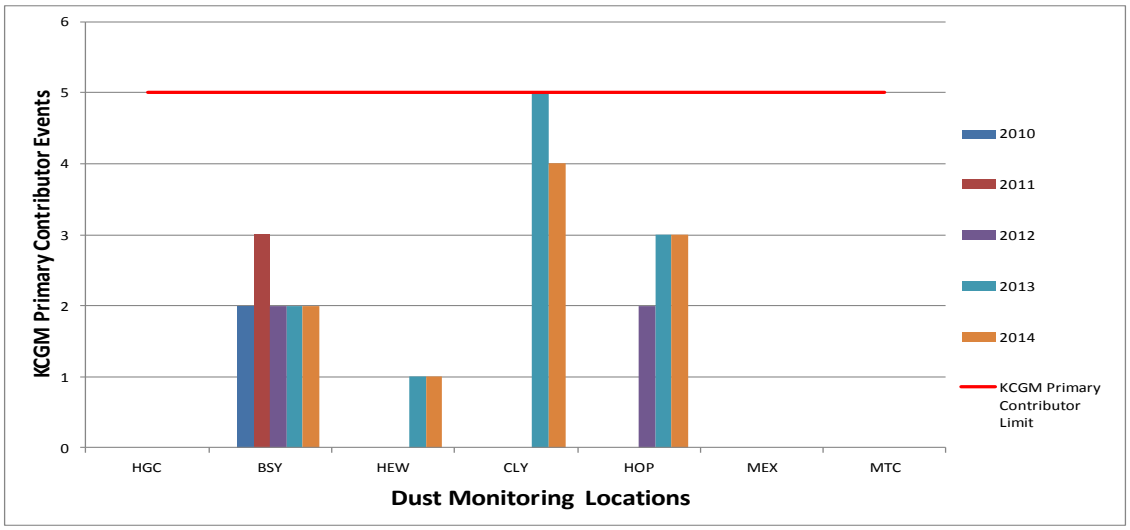

Figure 11: Dust Monitoring Events above 50 µg/m^3 (KCGM Primary Contributor)

3.2.3 Dust Management

KCGM have undertaken a number of measures to reduce dust emissions associated with the Fimiston Operations and to ensure that the 24-hour average PM_{10} concentrations are less than the NEPM guidelines at the monitoring locations, as well as reducing the occurrence of short term high concentration events that occur as a result of its operations. Specific measures include:

- 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;
- 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, dust monitoring levels, public feedback or prevailing wind conditions;
- Ensuring that all contractors and staff undertake 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.

The DMMP also includes a reactive management component based on the real time ambient PM_{10} monitoring network. The reactive component of the 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, are used to identify the potential sources of the emission. The reactive component of the DMMP also contains an alarm system in the case of missing data or instrument failure requiring remedial action.

The alert levels and action levels were initially determined by assessing the historical PM_{10} monitoring data from the BSY monitoring station on days where the measured 24-hour average PM_{10} concentration was greater than 50 $\mu g/m^3$. This analysis determined the average and maximum of the peak (initially 30-minute to 6-hour averages) to mean (24-hour average) ratios from the monitoring data. The “alert levels” were set at a point that is at or below the average peak to mean ratio while the “action levels” were set at a point at or below the maximum peak to mean ratio.

Alert levels are 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 are 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.

3.2.4 Mercury Monitoring

Investigations during 2005 revealed that naturally occurring mercury compounds in Golden Mile ore are released to the environment during processing. The dominant form of mercury is found in the telluride mineral Coloradoite (HgTe). The carbon kilns at the Fimiston Plant have been identified as an area in which mercury is volatilised from the processing stream.

An independent assessment revealed that the levels being emitted from KCGM posed no risk to workers or the community. Although modelling of mercury levels in the community predict that the annual average concentrations for residential air quality are below World Health Organisation guideline values, KCGM has implemented the Carbon Kiln Mercury Emissions Reduction Program to manage mercury emissions from the carbon kilns. Detail on the program has been included in the Fimiston Air Quality Management Plan (FAQMP).

An Air Quality Control Strategy (AQCS) to protect the community applied to the carbon kilns when they were identified as a potential source of mercury emissions. Since then, a scrubber to reduce mercury emissions has been designed, installed and commissioned. It is a hyper saline wet scrubbing system that enables the mercury to be reabsorbed back into the discharge to tailings. Emission testing has shown that the scrubber captures more than 50% of mercury emissions. When the scrubber is not available for operational reasons or maintenance the AQCS is implemented.

KCGM completed a targeted mercury and nickel ambient monitoring programme (MNAMP) during April 2011 that measured the concentrations of mercury and nickel in ambient air in Kalgoorlie-Boulder. While the results of the ambient mercury monitoring were in line with expectations, the short duration of the April 2011 monitoring program did not allow determination of long term concentrations.

Further monitoring of ambient mercury was conducted for a twelve month period using passive samplers as specified in the FAQMP. The 12 month ambient mercury monitoring programme commenced in February 2012 and initially involved monitoring at one location (HEW). A second monitoring location (CLY) was added in September 2012 and monitoring at both sites was undertaken until March 2013.

The interim results of the ambient mercury monitoring program were provided prior to a meeting held (19 December 2012) between KCGM the OEPA, DER and DOH to review the 2012 FAQMP. The OEPA reviewed the results of this program and in a letter to KCGM (14 August 2013) advised that the document was reviewed and considered to satisfy the requirements of the required ministerial conditions (Ministerial Statement 782). Subsequently, the final ambient mercury monitoring report was provided to the OEPA via email 25 November 2013 which found that only four of the 116 ambient samples collected and analysed returned a result above the Limit of Reporting.

Total emissions of mercury released to atmosphere from the Fimiston Operations are estimated by KCGM and reported in the National Pollutant Inventory (NPI) each year. The mercury emission estimates for the Fimiston Operations reported to the NPI over the last five years is presented in Table 11.

Table 11: Fimiston Estimated Annual Mercury Emissions to Air

Fimiston Operations Annual Emission to Air (kg)	Reporting Period				
	2010	2011	2012	2013	2014
Point Sources	434	295	395	356	369
Total	434	295	395	356	369

3.2.5 Mercury Management

The amount of mercury emitted to atmosphere from the Fimiston Plant is variable from year-to-year, and depends on various Carbon Regeneration Kiln operating parameters. The carbon treated in the carbon regeneration kilns is sourced from the Carbon in Leach (CIL) Plant 1, and CIL Plant 2/3 and Gidji. Each of these different carbon sources typically has different mercury loadings. Therefore the throughout rate of each type of feed has a bearing on mercury emissions from the Carbon Regeneration Kilns, and these emissions are managed in accordance with the Carbon Kiln Mercury Emissions Reduction Programme. A wet scrubber is used to treat emissions from the Carbon Regeneration Kilns, capturing approximately 60% to 70% of mercury emissions based on emissions testing completed in 2010. The wet scrubber is periodically partially or completely bypassed and this is also managed in accordance with the Carbon Kiln Mercury Emissions Reduction Programme.

In 2013 KCGM announced plans to reduce atmospheric emissions of mercury from the Fimiston Plant by more than 90%, through the implementation of the Fimiston Emissions Reduction Project (ERP). The Fimiston ERP involves the installation of new equipment to improve the capture of gaseous mercury emissions from the Gold Room and the Carbon Regeneration Kilns.

The changes in the Gold Room will include improved ducting and capture of mercury from the off-gases; a new Retort Oven (RTO) and filtration system to collect elemental mercury; and a Sulphur Impregnated Carbon (SIC) filter to absorb any gaseous mercury after the gas passes through the retort process. The changes in the Carbon Regeneration Kilns include a third kiln, venturi and packed bed scrubber, RTO, and SIC filter bed. This will remove around 90% of mercury that is currently emitted to the atmosphere from the Fimiston Processing Plant.

In addition to mercury emissions, the kiln-off gas system will also capture Volatile Organic Compounds (VOCs). These originate primarily from flotation reagents used in the current operation and are emitted from the Fimiston Carbon Kilns and Gold Room. A venturi scrubber with a RTO will reduce VOC emissions. Construction has commenced, and the project is scheduled to be operational by the end of 2015.

In addition to the Fimiston ERP, KCGM is also implementing the Gidji ERP which will replace the need for roasting and therefore eliminate atmospheric emissions of mercury, and sulphur dioxide (SO_2), from the Gidji Processing Plant. While it was originally scheduled that the roasters would be closed by December 2015, this project is well ahead of schedule. One roaster was permanently closed in February, and while the second stopped operating in April it will be permanently closed in June 2015 once the UFG is successfully commissioned.

3.3 Water

3.3.1 Objectives

Water

- Optimise the supply and use of water so that a cost efficient, low risk, process water supply is maintained.

Overview

KCGM uses on average approximately 13.2 gigalitres of water each year. Approximately 17% is potable water obtained from the Goldfields and Agricultural Water Supply Scheme, approximately 3% is treated effluent water from the South Boulder Wastewater Plant and the remainder is saline water obtained from groundwater and water recovered and recycled from operations (Figure 12). Water efficiency use (kilolitres/tonne milled) is shown in Figure 13.

The total dissolved solids (TDS) content of the naturally occurring saline waters ranges from approximately 30,000 to about 200,000 milligrams per litre (sea water has about 35,000 to 40,000 milligrams per litre of TDS).

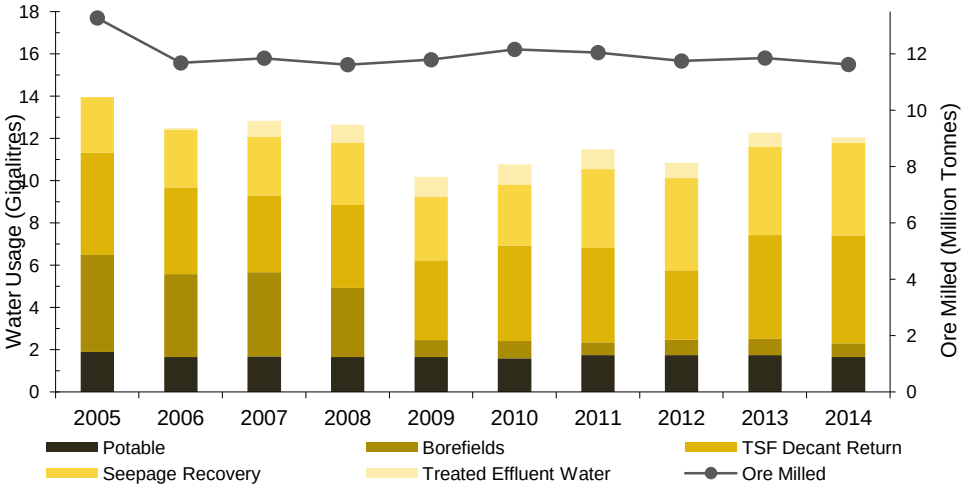

Figure 12: Water Use 2005 – 2014

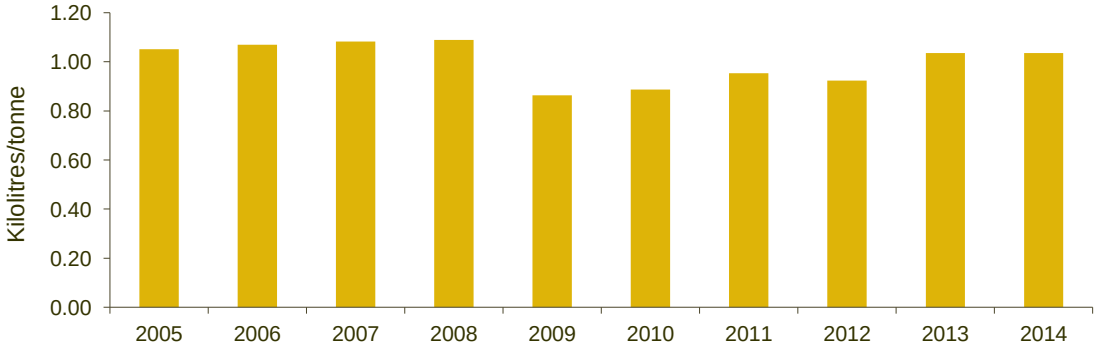

Figure 13: Water Efficiency Use 2005 – 2014

3.3.2 Management Initiatives

KCGM is focused on the continual improvement of site-wide water supply and use to maintain a cost efficient and low risk process water supply. This is an ongoing process as water use and projected future water demands are monitored.

KCGM developed and submitted the first Water Efficiency Management Plan (WEMP) to the Water Corporation (WCorp) in September 2008. In August 2013 KCGM were advised by the WCorp that it had been five years since KCGM joined the WEMP Program and during that time KCGM had contributed to the programs water savings of 18.5GL. KCGM will continue to participate in WEMP and report business water saving targets, and relevant actions and initiatives and annual progress reports. For the review period 2010-2014 KCGM received positive feedback on water efficiency and management from the WCorp.

KCGM remotely monitors the status of the production bores and can assess in real time how many bores are pumping. Bores that are not operating are flagged for inspection and maintenance work completed to return them to service.

3.3.3 Process Water Substitution

Considerable savings continue to be realised by the blending of water from Chaffers and Mount Charlotte dewatering, Fimiston TSF decant water and groundwater from the Fimiston TSF seepage recovery borefield (commonly known as the Eastern Borefield). This reduces the consumption of hypersaline groundwater from the remote borefields. The groundwater from these borefields is treated with lime to adjust the pH to a level suitable for the carbon in pulp process. Background and naturally occurring groundwater extracted from the Eastern Borefield typically has a low pH and relatively low magnesium content.

Mathematical models have been used to help optimise the water use and choice of water supply sources. The models are also assisting to manage and predict the storage and fate of process and decant waters.

Through this practice the following benefits are realised:

- Reduction in the relative consumption of water from remote borefields;
- Reduction in the specific rate of lime consumption and in the specific rate of greenhouse gas emissions related to lime manufacture;
- Reduction in energy use by pumping water from shorter distances; and
- Reduction in the risk of saline water spills along pipeline easements from the remote borefields to the Fimiston Plant.

3.4 Energy and Emissions Management

3.4.1 Objectives

- Optimise operations to save fuel and energy, and reduce greenhouse emissions.
- Optimise operations to maintain or reduce pollutant emissions.

Overview

Australian corporations that meet reporting thresholds are required to report their emissions and energy information to the Clean Energy Regulator each year under the National Greenhouse and Energy Reporting NGER) Scheme. The NGER data publication is released to provide information about greenhouse gas emissions and net energy consumption. KCGM's reporting period for NGERS is based on the financial year (July – June). The main sources of greenhouse gases from KCGM Operations are from the combustion of diesel in the mining fleet and combustion of diesel and gas to meet power requirements. Table 12 outlines the Greenhouse Gas Emissions and Energy emitted over the five year reporting period which shows a decrease in Scope 1 and 2 emissions.

Over the period 2010-2014, KCGM initiated and executed several projects to reduce fuel and electricity consumption. These projects have reduced CO^2 emissions through a combination of approaches, namely:

- Reducing the static weight of some mobile equipment for a fuel usage reduction;
- Increasing the efficiency of some processing operations for electricity usage reduction; and
- Reducing the running hours of some equipment for electricity usage reduction.

KCGM continues to track the success of the implemented projects.

Table 12: Greenhouse Gas Emissions and Energy at KCGM 2010 - 2014

Reporting Year	Greenhouse Gases			Energy	
	Scope 1 (t CO^2 –e)	Scope 2 (t CO^2 –e)	Total Scope 1 & Scope 2 (t CO^2 –e)	Energy Consumed (GJ)	Energy Produced (GJ)
2010	227,991	319,917	547,908	4,681,820	-
2011	204,131	252,279	456,410	4,725,655	-
2012	209,721	231,508	441,230	4,336,549	6,559
2013	217,182	255,418	472,600	4,892,088	1,428
2014	204,131	252,279	456,410	4,725,655	-

The National Pollutant Inventory (NPI) provides information to the public on emissions of pollutants to the environment. Reporting of emissions for the NPI is based on a trigger system. If a facility uses, produces or handles more than a set amount of a listed substance, then that substance is "triggered" and emissions of that substance must be estimated and reported. KCGM's reporting period for NPI is January – December each year and operations are reported as two facilities – Fimiston and Gidji Operations. KCGM has submitted an NPI report for both the Fimiston and Gidji Operations from 2010 to 2014.

3.4.2 Fimiston Emissions Reduction Project (ERP)

The Fimiston Emissions Reduction Project (ERP) involves the installation of a new retort oven in the Gold Room, an off-gas scrubber and a Sulphur Impregnated Carbon (SIC) filter bed on the Carbon Regeneration Kiln, a third Carbon Regeneration Kiln and a Mercury Storage Facility. In addition, mercury capture from the electrowinning circuit will be improved and a Regenerative Thermal Oxidiser (RTO) will be installed on the Carbon Regeneration Kilns to reduce volatile organic compounds (VOCs). The project will result in the capture of more than 90% of the atmospheric mercury emissions from the Carbon Regeneration Kilns.

A Works Approval Application was submitted to the DER in October 2013. The application was approved in March 2014 and construction has commenced with the project expected to be operational in 2015.

3.4.3 Gidji Emissions Reduction Project (ERP)

The reduction of atmospheric stack emissions associated with the operation of the roasters at Gidji has been a long-term focus of KCGM and its Joint Venture Owners. Following the formation of KCGM in 1989, the establishment of the Gidji Operation resulted in the decommissioning of the remaining three in-town roasters. This resulted in a significant reduction in sulphur dioxide (SO_2) levels in the City of Kalgoorlie-Boulder.

KCGM has been investigating alternatives to roaster concentrate treatment since the 1990's. Roasting is still the most efficient and cost effective way to maximise gold recovery from sulphides, however this process is becoming more restricted due to environmental constraints associated with the atmospheric stack emissions of SO_2 and mercury (Hg).

Since early 2001, KCGM has successfully operated a 10 tonnes per hour (tph) Ultra Fine Grinding (UFG) Mill at Gidji to supplement its roaster capacity for the treatment of concentrate. A second 10 tph UFG Mill was installed at Fimiston in 2002. These were the first commercial trial of UFG Mills in sulphide gold mining.

Since 2002 a development programme involving trials, pilot plants and laboratory test work has been undertaken. This has resulted in process improvements and a better understanding of the milling and gold leach processes that have assisted in narrowing the gap between UFG and roasting for concentrate treatment.

Although UFG has a lower gold recovery and higher energy and cyanide consumption, it has proven to be a feasible alternative concentrate treatment option. KCGM planned to install a 30 tph UFG Mill at Gidji with the ultimate aim of closing the roasters following commissioning of the larger UFG circuit. This Emissions Reduction Project (ERP) will eliminate atmospheric stack emissions from the Gidji Operation by December 2015.

The Gidji Roaster has been the subject of two previous environmental impact assessments by the Environmental Protection Authority (EPA): a Public Environmental Review (PER) in 1988 (Phase I) and a Notice of Intent (NOI) in 1989 (Phase II). Approval was granted by the Minister for the Environment via Ministerial Statement 28 - Gidji Gold Roaster Phase I (May 1988) and Ministerial Statement 77- Gidji Gold Roaster Phase II (September 1989).

On the 31 January 2014 KCGM submitted an application under Section 45C of the *Environmental Protection Act 1986* (EP Act) to advise the following changes to the Gidji Roaster as approved under Ministerial Statement 77:

- Installation of a 30 tph Ultra-Fine Grinding (UFG) mill to be operated in conjunction with the existing 10 tph UFG mill to process refractory ore concentrate.
- Closure of the two roasters at Gidji, following successful commissioning of the larger UFG circuit.

On the 26 March 2014 KCGM received a letter from the EPA notifying KCGM that the Section 45C application was approved without a revised proposal being submitted to the EPA.

A Works Approval/Mining Proposal was submitted to the DER and DMP in March 2014 to install the 30 tph UFG Mill at Gidji with the ultimate aim of closing the roasters following commissioning of the larger UFG circuit. The DMP and DER approved the application in May 2014 and June 2014 respectively. The construction of the ERP has commenced and is expected to be operational in 2015.

3.5 Rehabilitation and Closure Planning

3.5.1 Objectives

- Rehabilitate previously disturbed areas to a self-sustaining ecosystem considering visual amenity and rehabilitation materials used.
- Ensure areas designated for revegetation will provide appropriate habitat for native fauna in keeping with the local environment and post closure land use.
- Ensure plans are in place for the continued management of the site in accordance with agreed closure criteria.

3.5.2 Closure Plan

The KCGM Mine Closure Plan covers all operational areas managed by KCGM and documents activities required for the successful closure of the site (planned closure) and a care and maintenance phase (unplanned closure). The Mine Closure Plan is a dynamic document that is regularly reviewed and updated throughout the life of mine (LOM) to ensure any changes in operations, legislation, community expectations and technical knowledge in closure aspects are considered as part of KCGM closure planning.

In accordance with the requirements of Ministerial Statement 782 and tenement conditions, KCGM undertakes a review of the Mine Closure Plan every three years. The latest version of the Mine Closure Plan that has been approved by the OEPA is entitled "Mine Closure Plan 2012: Resubmission". It was approved by the OEPA on the 4 November 2013, and is based on a planned closure of the site in 2022.

In March 2015 KCGM submitted a revised Mine Closure Plan to the OEPA for approval. The 2015 Mine Closure Plan reflects KCGM's current plan for mining at the Fimiston Open Pit until 2019, and the processing of gold at the Fimiston Processing Plant until 2029. Scheduling and prioritisation of closure activities have been adjusted accordingly, and the revised schedule is presented in the 2015 Mine Closure Plan.

KCGM has taken a risk based approach to prioritisation of work undertaken for closure. The highest risks for closure are related to safety during demolition and rehabilitation activities. Risks will continue to be managed using existing KCGM procedures, team based risk assessments and other management tools. Demolition risks will be addressed at the time of the activity, which may occur after the operational phase. Risks associated with earthmoving during progressive rehabilitation are managed by means of existing safety processes.

3.5.3 Closure Strategy

The KCGM closure strategy learns from past site specific experience (performance of progressive rehabilitation efforts) and undertakes additional focused closure studies to provide the science behind final closure designs. This is an iterative process and entails often complicated option assessments to establish the most beneficial long term strategy. Planned final closure is still approximately fifteen years away.

3.5.4 Current and Completed Closure Projects

The KCGM strategy for closure studies is focused on prioritising closure risks that can be influenced by operational activities.

Closure Provisioning

As part of Joint Venture Owner requirements KCGM undertakes a rigorous annual closure costing review. This process reviews and improves designs, methodologies and costings to ensure that adequate funds are allocated for closure. .

Development of Acceptable Completion Criteria

Both the EPA and the DMP require measurable completion criteria in the MCP, to define closure success. For a company to make informed decisions when defining achievable and realistic completion criteria, considerable scientific information and understanding of potential risk is required.

KCGM has had numerous discussions with Regulators, specifically related to mine waste landforms. The Regulators are aware of the site limitations with respect to rehabilitation materials availability (related to the site being extensively mined for over 100 years) and footprint constraints. KCGM will continue to review closure designs and strategies. Development of completion criteria will continue to evolve as more information becomes available.

Visual Amenity Rehabilitation Concept

Due to limitations in available rehabilitation volumes and the proximity of the Fimiston Operations to residential areas, the concept of prioritisation of rehabilitation materials began to emerge in discussions with Regulators from around 2011.

KCGM has developed the visual amenity concept as a decision making tool to prioritise rehabilitation material usage; the best rehabilitation materials are intended to be used on landform slopes that are highly visible to the City of Kalgoorlie-Boulder. Landforms have been classified into one of four groups based on their visual amenity (visibility) to the City of Kalgoorlie-Boulder; Highly Visible, Moderately Visible, Visible at a Distance and Minimally Visible. It is intended that these ratings will be used along with other planning parameters, such as haul distances, to prioritise rehabilitation movement. Lower quality materials will be allocated to areas which are less visible to the public, and conversely, higher quality materials to areas which are very visible to the public.

Waste Dump Closure Planning Strategy

Guiding Principles

Guiding principles when developing this strategy were to:

- Align mining / mine planning and environmental requirements;
- Develop final closure waste dump designs, specifications and standards;
- Optimise costs;
- Prevent rework;
- Consider practical operational limitations in closure designs; and
- Ensure waste dump design aligns with regulatory requirements and community expectations.

Outcomes to Date

Key tasks undertaken include:

- Progressive rehabilitation performance review;
- Review closure waste dump design;
- Study erodability of available KCGM rehabilitation materials;
- Review of Material Classification System; and
- Increase site awareness of closure requirements.

The majority of waste at Fimiston consists of competent hard rock (basalt and dolerite), with large areas of the Waste Rock Dumps (WRDs) still in an active dumping phase.

Due to operational/closure opportunities, there has been an increased focus on refining WRD closure planning for Fimiston. The Fimiston Operational Area has significant constraints on the development of landforms, in particular for WRDs. The footprint is constrained in the west by infrastructure and residential areas of the City of Kalgoorlie-Boulder, to the north by infrastructure (powerlines and Bulong Road), to the south by infrastructure (Mt Monger Road), and to the east by a water course and tenement boundaries. In addition there is the vertical constraint of the Obstacle Limiting Surface (OLS) for the Kalgoorlie-Boulder Airport. Optimisation of successful rehabilitation designs and waste dump capacity are equally important considerations.

Soils and oxides have been stockpiled for rehabilitation, however, these materials are generally saline, in some cases sodic, and are prone to erosion. Additionally, material characterisation work has shown that many of the proposed rehabilitation materials are in reality less than ideal and even the original vegetation and soils are less than perfect due to the historically degraded nature of the area. While the integrity of soil is best retained through immediate respreading this is not always possible given WRD construction and progressive rehabilitation schedules. KCGM stockpiles materials to use in landform rehabilitation, however, due to the historical nature of the site there have been some uncertainties with regards to the properties of these materials.

A substantial programme of rehabilitation material characterisation has been conducted, with the data used to create a revised rehabilitation material classification scheme, with a strong emphasis on erodability. The revised classification system is detailed in the 2015 Mine Closure Plan. Rehabilitation Materials were reclassified under the revised system to update the Materials Balance Inventory. KCGM can use this, together with the Visual Amenity concept to identify and prioritise areas to receive rehabilitation materials.

Improved WRD slope designs have been developed, with:

- A high percentage rock mixed into the batter surface;
- Robust crest bunds;
- Backsloping berms;
- Water control on upper surfaces; and
- Soil water holding capacity considerations.

The implementation of this design has been successfully trialled on the Northern WRD.

Review of Rehabilitation Monitoring Methods

From 2012 a study has been conducted for improving vegetation and erosion assessment, with the objective to develop a methodology that provides clearer linkage to success criteria in alignment with the EPA Guidance Statement No. 6 (Guidance for the Assessment of Environmental Factors Rehabilitation of Terrestrial Ecosystems). Initial work focused on an assessment of data and reporting using past monitoring methodologies. Guidance was also given for possible rehabilitation monitoring methods that could be used in lieu of previously used methods, which have been successfully implemented on other Goldfields sites. These improvements are being field trialled.

Vegetation Associated with Aboriginal Heritage Sites

Ministerial Statement 786 requires KCGM to ensure mining does not impact on the vegetation associated with Aboriginal Heritage Sites (AHS). A project was conducted in 2013 to assess the health of vegetation associated with each AHS. AHS were categorised based on whether or not they had vegetation, and if so, vegetation was assessed by a botanical expert. The outcomes of the assessment did not identify any mining activities nearby or impacting on the vegetation surrounding AHS.

KCGM has an internal approval process in place prior to ground disturbance activities, to ensure that appropriate controls are in place prior to commencing proposed works. As part of this process, a check is done to ensure Aboriginal Heritage sites will not be affected by proposed works.

Pit Lake Hydrology

The Fimiston Open Pit lake model was updated in 2014/15. Outcomes from this work have been incorporated into 2015 Mine Closure Plan.

Other Studies

Demolition Plan

An updated Demolition Plan was completed in 2014. The scoping of the study was a combined effort between environmental and engineering staff. The layout has been aligned with operational engineering numbering conventions, and provides costings and a basic outline of how the demolition will be achieved.

Preliminary Contaminated Sites Work

Review of data and further information gathering for reported Contaminated Sites is ongoing, with the aim of developing Preliminary Site Investigations for some key areas with greater public interaction, such as the Morrisons Flats area. There are also several areas reported as contaminated sites which KCGM are likely to apply for remediated status as they have since been encapsulated under WRDs.

TSF Seepage Management

During operations, seepage into the groundwater system has occurred at the TSFs, causing groundwater levels to rise. At each of the TSFs, the groundwater levels are controlled by seepage and groundwater recovery borefields, which are operated and adjusted as necessary to prevent naturally saline groundwater rising into the root zone of vegetation. Once tailings deposition ceases after closure of the Fimiston Plant, seepage from the TSFs will continue at reducing rates, and continued operation of the borefields will be required. The duration and rate of pumping will be a function of the residual seepage rates from the TSFs, and the final closure criteria for groundwater levels which are determined and incorporated into future versions of the MCP.

For the Fimiston TSFs, an investigation into rates of draindown and residual seepage in closure was undertaken. Numerical cross section models were constructed through each deposition paddock in each TSF. For the closure period, the models applied the predicted infiltration rates at the TSF surface, and investigated the time for the saturated tailings to drain down, and the long term residual seepage rate from the TSFs driven by infiltration at the surface. The model results identified that TSF drain down would be achieved within two years, and that long term ongoing seepage rates to the groundwater system underlying the whole of each tailings deposition cell would be in the range 2 to 5 L/s.

Further refinement of these aspects will be considered prior to closure. KCGM has received advice from independent hydrogeologists that complex mathematical models are unlikely to be able to provide accurate predictions for the closure pumping, and conceptual and empirical calculations are likely to provide greater certainty in predictions.

3.5.5 Planned Closure Projects (2015 Onwards)

TSF Closure Planning Strategy

Guiding Principles

Guiding principles when developing this strategy are to:

- Align operational / mine planning and environmental requirements;
- Develop final closure TSF designs, specifications and standards;
- Optimise costs;
- Prevent rework;
- Consider practical operational limitations in closure designs; and
- Ensure TSF design aligns with regulatory requirements and community expectations.

Fimiston TSFs

The Fimiston I, Fimiston II and Kaltails TSFs are similar in design and treated under a single closure planning task, the Fimiston TSF Closure Planning Strategy.

Key tasks for this project are:

- Situational review;
- Refinement of geotechnical criteria;
- TSF Closure Design;

- Optimise costs;
- Consider practical operational limitations in closure designs;
- Ensure TSF designs align with regulatory requirements and community expectations;
- Cover Material Haulage Strategy; and
- Increase awareness of closure requirements and implications during operational decision making.

Open Pit Abandonment Strategy

KCGM has previously conducted considerable investigative work associated with site specific Fimiston Open Pit wall stability. This work, as well as two peer reviews, was presented and approved in the Fimiston Gold Mine Operations Extension (Stage 3) and Mine Closure Planning and the Mining Proposal Resubmission Fimiston Gold Mine Operations Extension (Stage 3) – Golden Pike Cutback and Northern Waste Landform, 2009.

It is intended to review and update the geotechnical considerations, which may result in changes to some existing commitments.

3.5.6 Rehabilitation

Rehabilitation at KCGM is undertaken progressively during the life of the mine. The benefits of progressive rehabilitation include the early establishment of vegetation, which reduces dust levels and improves visual surroundings. This will also allow rehabilitation methods to be trialled and refined to determine the most suitable and successful methods for final closure of the KCGM operations. In addition this also results in a significant reduction in the amount of rehabilitation required when mining is completed. A Schedule of Rehabilitation Activities is included in the 2015 Mine Closure Plan.

4. EXTERNAL PEER REVIEW AND BENCH MARKING

Due to the location of the Fimiston Operations in relation to the City of Kalgoorlie-Boulder, KCGM is continually investigating ways to improve its performance and reduce the potential environmental impacts resulting from its operations. KCGM's owners (Newmont and Barrick) use technical experts, including personnel from its other operations and consultants, to regularly undertake reviews of KCGM's operations. These reviews assist with the transfer of current best practice information between operations.

KCGM's consultants and advisers also actively review available technology and operating practices to see if improvements can be made to reduce environmental impacts. In some cases, such as noise mitigation KCGM often finds itself at the leading edge of technology application where it is developing new approaches to reducing potential environmental issues.

The Fimiston and Gidji Emission Reduction Projects were developed following an extensive review of available technology and current industry practices.

4.1 Independent Environmental Auditor

In accordance with Ministerial Statement 782 Condition 5-3, and with endorsement from the Community Reference Group (CRG), Mr Keith Lindbeck of Keith Lindbeck and Associates was appointed as the Independent Environmental Auditor (Auditor). The Minister was advised of Mr Lindeck's appointment on 17 June 2009. The Auditor is tasked with auditing Ministerial Statements, Operating Licences and Environmental Management Plans and providing six monthly compliance reports to the CRG for an initial period of eighteen months.

At the completion of the initial eighteen month audit period three six monthly audits were completed by the Auditor and presented to the CRG. The reports are available on the KCGM website: www.superpit.com.au.

Ministerial Statement 782 Condition 5-3(6) provides that the proponent shall fund the Auditor for an initial period of eighteen months at which time the auditor shall carry out an overall review of the eighteen month period and advise the Minister as to whether the independent auditing should continue. The overall review of the eighteen month period was completed by the Auditor in the first quarter of 2011 and the advice, provided in a report, was submitted to the Minister on the 14 April 2011.

In his advice to the Minister the Auditor recommended that an additional two audits (each for six monthly periods) be undertaken to ensure that three independent audits are undertaken over an eighteen month period of active mining in Golden Pike. This recommendation was made in response to the delayed start of mining of the Golden Pike Cutback which commenced in March 2010, rather than the approved start date of the 29 January 2009. It was proposed that the two audits would conclude on the 28 July 2011 and that following the completion of these audits a further summary report covering these additional audits would be provided together with a recommendation to the Minister on the continuation or cessation of the audit process.

On 3 June 2011, the Minister advised the Auditor that he had accepted the recommendation for the continuation of the audit for a further two audit periods with the audit period to cease on 28 September 2011. He also requested a further review and recommendation from the Auditor for continuation or cessation of the audit process on completion of the second audit period (28 September 2011).

On 30 June 2011, KCGM requested that the Auditor consider that the two additional audit periods cover the periods 29 July 2010 to 31 March 2011 and 1 April 2011 to 30 September 2011 as these dates coincide with KCGM's quarterly reporting periods. This was agreed to by the Auditor. The results of the fourth audit were presented to the CRG on the 8 March 2012 and the results of the fifth audit presented to the CRG on the 17 May 2012.

In a letter from the OEPA dated 22 August 2012 and addressed to the General Manager of KCGM, the OEPA confirmed that it had reviewed the information provided by the Auditor and was satisfied that the requirements of conditions 5-3 and 5-4 had been meet and are classified as "Completed" and the OEPA compliance monitoring database had been updated to reflect the status of the conditions.

4.2 Environmental Management System Certification (ISO 14001)

In September 2013 KCGM gained the international recognised ISO 14001 Certification for Environmental Management Systems following Stage 1 and Stage 2 ISO 14001. ISO 14001 sets out the criteria for an environmental management system and maps out a framework that a company or organisation can follow to set up an effective environmental management system. Using ISO 14001 can provide assurance to company management and employees as well as external stakeholders that environmental impact is being measured and improved.

The BSI Group, who conducted the ISO 14001 Certification audits of the KCGM Operation, identified the following strengths:

- Positive environmental performance in the last 12 months with no reportable exceedences of licence limits or requirements;
- Integrated KCGM policy and strong strategic and tactical planning process;
- Informative Environmental Management Programmes aligned with significant environmental aspects & impacts (Air Emissions, Tailings, Noise & Vibration, Water Management, etc.);
- Use of management systems for incident/non-compliance recording and relating cause classification and corrective action; and
- Impressive process of drill & blast design using advanced predictive and monitoring methods and appropriate reaction to resident's concerns.

KCGM is due for re-certification in 2016 following annual ISO 14001 surveillance audits in 2014 and 2015.

5. STAKEHOLDER CONSULTATION

KCGM's proximity to the City of Kalgoorlie-Boulder means that community consideration is a priority and KCGM conducts its operations in a manner to minimise potential impacts. KCGM has an established stakeholder engagement network and utilises a range of mechanisms to facilitate consultation and capture input from the wider Kalgoorlie-Boulder Community on an ongoing basis.

5.1 Key Stakeholders

A summary of key stakeholders and areas of consultation are listed in Table 13.

Table 13: Stakeholder Consultation

STAKEHOLDER	CONSULTATION
GOVERNMENT AGENCIES	
City of Kalgoorlie-Boulder (CKB)	• Land access and property • Strategic Town Planning • Mine Closure Plan • Standing invitation to the Community Reference Group (CRG) monthly meetings
Clean Energy Regulator (CER)	• Annual National Greenhouse and Energy Report
Department of Environment and Regulation (DER)	• Fimiston Air Quality Management Plan (FAQMP) • Dust events above NEPM Guideline • Annual Environment Report • Mine Closure Plan • Annual Audit Compliance Reporting • Environmental Approvals • Noise Regulation 17 Variation and NVMMP • Annual Inspection • Operating Licences • Air Quality Data • Life of Mine Approvals • National Pollutant Inventory • Standing invitation to the CRG monthly meetings
Department of Health (DoH)	• FAQMP • Dust events above NEPM Guideline • Standing invitation to the Community Reference Group
Department of Aboriginal Affairs (DAA)	• Aboriginal and Cultural Heritage Management Plan • Mine Closure Plan • Standing invitation to the Community Reference Group
Department of Main Roads Western Australia (DMRWA)	• Permitting for haul truck transport on main roads • Voids management • Road Reserve information

STAKEHOLDER	CONSULTATION
GOVERNMENT AGENCIES	
Department of Mines and Petroleum (DMP)	• Annual Environment Report • Closure and rehabilitation planning/Mine Closure Plan • Environmental and Exploration Approvals • Life of Mine Approvals • Standing invitation to the CRG monthly meetings
Department of Planning and Infrastructure (DPI)	• Mine Closure Plan
Department of Water (DoW)	• Mine Closure Plan • Borefield Licensing
Heritage Council of Western Australia (HCWA)	• Boulder Railway Station, Subway, Loopline Railway and Cornwall Hotel
Water Corporation	• WEMP Programme
Office of the Environmental Protection Authority (OEPA)	• Annual Audit Compliance Report • Annual review of FAQMP • Dust events above NEPM Guideline • Noise and Blast Quarterly Monitoring Reports • Environmental Approvals • Air Quality Data • Life of Mine Approvals • Amendments to Ministerial Statements
NON - GOVERNMENT AGENCIES	
Chamber of Mineral and Energy (CME)	• Mining Industry representative body • Standing invitation to the CRG monthly meetings • KCGM representative attends bimonthly Community Relations and Goldfields Environment Forums
Kalgoorlie-Boulder Chamber of Commerce and Industry (KBCCI)	• Standing invitation to the CRG monthly meetings • Local and regional development
Kalgoorlie Boulder Urban Landcare Group (KBULG)	• Representative at bimonthly committee meetings • Urban land rehabilitation
Golden Mile Loopline Railway Society (GMLRS)	• Railway design and KCGM support

5.2 Consultation Forums

KCGM engages in a variety of activities to promote and educate people about environmental management and other aspects of the operations and consult with community stakeholders. The main community consultation forums include the Community Reference Group and the Public Interaction Line.

5.2.1 Community Reference Group

The Community Reference Group (CRG) was established by KCGM in late 1999, and provides a forum for the company to connect with the Kalgoorlie-Boulder community about KCGM operations, and to seek feedback from community representatives. The group meets monthly and minutes from the meetings are available to the public on the KCGM website: www.superpit.com.au.

Residents of the Kalgoorlie-Boulder community are encouraged to contact members of the CRG for information about KCGM operations, or to express their ideas, opinions or concerns. CRG members are encouraged to report back on these interactions as they occur, or during the group's regular meetings.

Contact information for the CRG members is available on the website and on KCGM public advertising. There are around 12 CRG members (numbers vary), with a standing invitation for representatives from the CKB, DER, DMP, DoH and DAA to attend.

CRG meetings are well attended with an average of 10 people attending each meeting during the reporting period of 2010 – 2014. This is an indication of the community's ongoing interest and support of this consultation forum.

Attendees gave feedback to KCGM on the following environmental activities:

- Dust management;
- Production Blasting management;
- Tailings storage facility tour;
- Environmental noise management and amelioration activities;
- Air quality;
- Seepage and ground water management;
- Environmental reporting activities;
- Environmental audit results;
- Gidji Processing Plant tour;
- Fimiston Processing Plant tour;
- Drilling and exploration activities; and
- Life of Mine and closure and rehabilitation planning.

5.2.2 Public Interaction Line

KCGM has a 24-hour Public Interaction Line (established in 1993) which 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 Interaction Line on any matter relating to the operations. It is a particularly important avenue for capturing those issues which require follow up and action. The Public Interaction Line is promoted regularly in print and radio advertising, radio interviews, online mediums (KCGM website) and printed materials (Information Sheets).

The Public Interaction Line (PIL) is backed up by an electronic database which enables the categorisation of queries and the automation of subsequent action allocation and follow-up mechanisms. The PIL database is also used to record significant interactions with stakeholders at both formal and informal meetings and is a very effective tool for analysing and tracking issues and impacts which are of concern to the community.

During business hours, PIL enquiries are referred immediately to the relevant department supervisor for appropriate action. Incoming calls received outside office business hours may be forwarded to the shift supervisor for immediate action or where appropriate will be followed up the next working day.

Once an internal review has been completed, the caller is informed of actions taken or outcomes of their enquiry or complaint. KCGM responds to all people who contact the PIL (and provide contact details) either by phone, in writing or in some cases meetings.

All PILs are reviewed on a daily basis and a summary of any complaints and corrective actions is provided each month to KCGM management, Joint Venture Owners Newmont and Barrick and to the CRG.

Figure 14 presents the number of complaints received related to environmental aspects of the Fimiston Operations over this five year review period. In 2014 there was a total of 18 complaints received relating to environmental aspects of the Fimiston Operations. Of these complaints, 7 related to vibration management, 9 to dust, and 2 to noise.

The trend in complaints data collected over this five year review period shows that the overall number of complaints related to environmental aspects of the Fimiston Operations has steadily declined since the peak that occurred in 2012. This peak was largely due to repeat complaints from two individuals which were investigated and resolved.

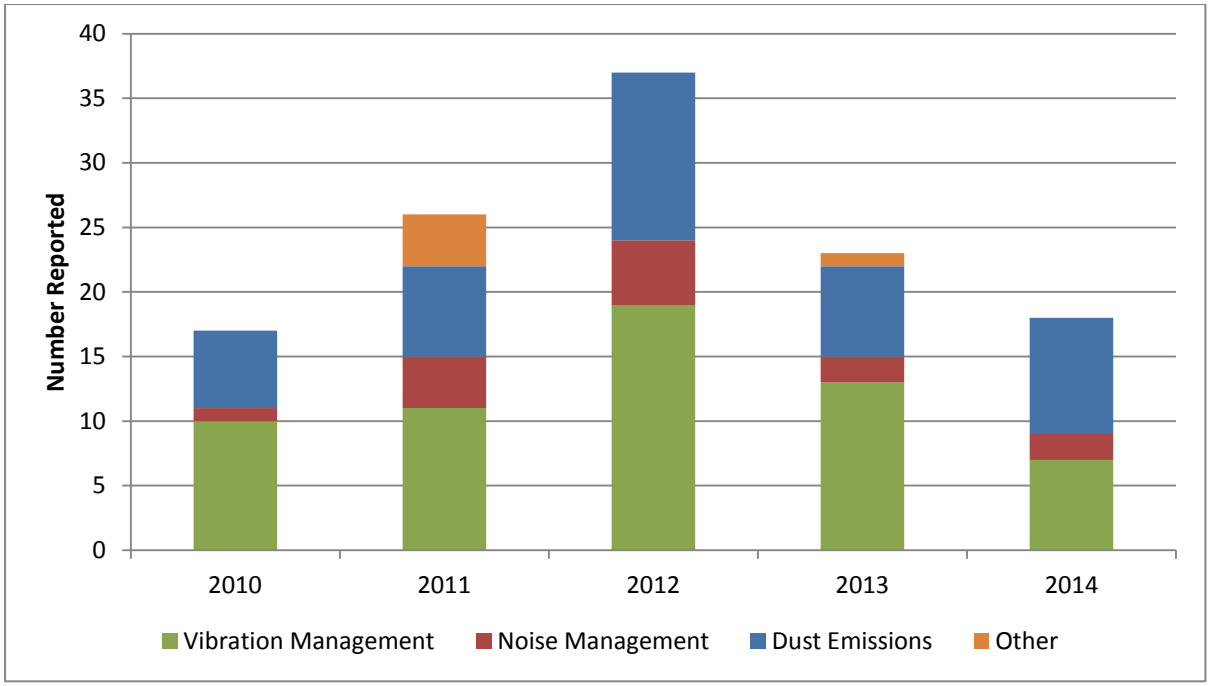

Figure 14: PIL Complaints Related to Environmental Issues

Notes: Data corrected since submission of previous Annual Audit Compliance Reports. In 2010 there was 1 noise complaint (previously reported 2), and in 2012 there were 13 vibration complaints (previously reported 16).

5.2.3 Other Consultation Forums

KCGM utilises a range of mechanisms in addition to the CRG and PIL to facilitate consultation and capture input from the wider Kalgoorlie-Boulder Community on an ongoing basis. These include:

- **Media Management** – KCGM actively engages the media to promote discussion on planning and project issues, and media mentions are recorded.
- **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.
- **KCGM Website** – Provides a range of information on KCGM operations and management of environmental and social aspects.
- **KCGM Information Sheets** – KCGM has developed a number of information sheets regarding key aspects of the operation, including management of noise, blasting, water and tailings, and KCGM's compliance to the Cyanide Code. Further information sheets are planned, including dust management, closure planning, exploration and Mt Charlotte operations.
- **Direct Notifications** – KCGM will notify residents of impending works, upcoming projects and before some blasts either by letter drop or phone. Daily blast times are also recorded as a voicemail message on PIL.
- **Mine Tours and Access to the Super Pit Lookout** – An agreement is in place with a local tourism provider to access the site for public tours. The lookout has become one of the region's main tourism destinations and includes a range of information on display about the KCGM operation.
- **Management and Employee Participation** – active volunteering, committee representation and event attendance.

6. ENVIRONMENTAL OBJECTIVES OVER THE NEXT FIVE YEARS

KCGM is a mature operation which has developed and refined its environmental objectives over the last 25 years. Whilst understanding that the current environmental objectives adequately represent the requirements for the operation, KCGM will continue to strive to improve its environmental performance in the coming years. Specific initiatives that are currently underway or under consideration include:

- Implement the Fimiston ERP to reduce the atmospheric emissions of mercury and volatile organic compounds;
- Refine the site wide water balance and management strategy to optimise the use of water at the Fimiston Operations;
- Undertake review of the Mine Closure Plan and continue with technical studies to ensure that it reliably reflects the current operations and that there are sufficient funds allocated for mine closure;
- Continue to research and implement viable mechanisms to reduce noise emissions from the equipment used at the Fimiston Operations;
- Continue to review airblast and vibration data and adjust blasting approaches as required to reduce potential impacts associated with blasting and;
- Implement the Gidji ERP that will result in the closure of the roasters at Gidji and the elimination of atmospheric emissions of mercury, sulphur dioxide, and particulate matter from the 180 m Gidji stack.