

ENVIRONMENTAL REVIEW

ENERGY

page 55

Using less energy in absolute terms – fuel and electricity – and using energy efficiently are the central tenets of Kumba's energy management programme.

WATER

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Kumba's water management programme focuses on using less in absolute terms and on water-use efficiency. Kumba's water management systems will be reviewed along the lines of the new energy management programme.

LAND AND REHABILITATION

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Considerable effort has been put into reviewing and revising Kumba's waste rock dump rehabilitation strategy. Kumba's land management strategy is now being implemented – we are committed to leaving behind legally compliant and environmentally sustainable landscapes.



Kumba's environmental management programme looks to minimise the use of natural resources and to conserve them – in this case soil

FOCUSING ON OUR ENVIRONMENT

CARING FOR OUR FUTURE

USING LESS

Environmental management entails reducing the consumption of resources, limiting wastage, and preventing pollution and other forms of degradation. This is accomplished with the aid of technology.

UNPOLLUTED ENVIRONMENT



LAND MANAGEMENT

Kumba owns substantial tracts of land, the management of which is an important part of its environmental management strategy.

LAND STEWARDSHIP



This section reviews Kumba's environmental performance. For a discussion on dewatering and groundwater pollution, refer to page 24.

Kumba aims to minimise and mitigate the environmental impact of its operations by taking a systematic and disciplined approach and applying comprehensive risk-based techniques that directly inform its strategic initiatives and plans. During 2010, Kumba focused on the management of the following environmental aspects: energy and CO₂ emissions; water; land, with specific focus on farms reserved for future mining, remediation of historical contamination, and waste rock dump rehabilitation; and compliance to legal and other requirements (refer to page 62).

ENVIRONMENTAL MANAGEMENT PROGRAMME

Sishen, Thabazimbi and Kolomela mines have approved Environmental Management Programme Reports (EMPRs) issued by the Department of Mineral Resources (DMR). As and when activities are changed or new activities added, the EMPRs are amended and submitted to the DMR for approval. In order to satisfy the requirements of Regulation 55 of the Mineral Petroleum and Resources Development Act (MPDRA, 2002) and Regulation GN 704, the mines undertake annual performance assessments against commitments made in the EMPRs for submission to the DMR. As part of mine closure plans, extensive physical and financial assessments are conducted to address requirements of the MPRDA in relation to financial provisioning for mine closure.

A comprehensive rehabilitation strategy for Sishen Mine was developed in 2010. The strategy considers possibilities for concurrent rehabilitation, the issuing of a bank guarantee to DMR for Sishen Mine, the provision of Thabazimbi Mine's shortfall into the Kumba Rehabilitation Trust Fund as agreed with DMR, and the acquisition of an integrated water-use licence for Thabazimbi Mine.

Environmental management is an integral part of the way we operate and is not confined to a single department within the company. For example, energy and water consumption and efficiency, plus greenhouse gas emissions, are championed by the Technical Department.



STRATEGIC CONSIDERATIONS

Kumba believes that a well-conceived and executed environmental strategy provides a competitive advantage. The environmental strategy aims to position the company as a proactive responsible corporate citizen which acts beyond legislative compliance. In 2010 we identified five priority areas using a risk-based approach and global trends, for management attention. Our strategic approach compels us to invest more in pollution prevention technologies, strategic partnerships, collaboration with government and other key stakeholders, and less on clean-up technologies.

There are some areas, for example acquiring the applicable licences for certain activities affected by recent changes in legislation, where we are still working towards the achievement of full legal compliance.

Our 2011 environmental management priorities and focus area are summarised as follows:

Priority 1: Energy and CO₂ emissions management

- Monitoring, measuring, reporting and target setting in line with outcomes of the Copenhagen Conference and the Anglo American strategy
- Gap analysis using the Anglo American Group Technical Standard for energy and greenhouse gas emissions as a benchmark
- Implementation of energy saving and energy efficiency projects

Priority 2: Water management

- Monitoring, measuring, reporting and target setting
- Gap analysis using the Anglo American water technical standard as a benchmark
- Implementation of water saving and water efficiency projects

Priority 3: Assurance

- Licensing of listed activities and compliance to obligations
- Stakeholder management
- Audits, reviews and self-assessments
- Monitoring and reporting

Priority 4: Remediation and pollution prevention

- Remediation of historical impacts
- Training and awareness
- Gap analysis on pollution prevention
- Preventing pollution

Priority 5: Land management and biodiversity

- Implementation of approved land uses on Kumba-owned farms
- Updating closure costing and closure plans
- Implementation of biodiversity action plans
- Physical rehabilitation of waste rock dumps

ENVIRONMENTAL STRATEGY

The environmental strategy aims to position the company as a proactive and responsible corporate citizen which acts beyond legislative compliance.



PLAN-DO-CHECK-ACT

Kumba's environmental management systems are based on ISO 14001 and are certified accordingly. The system's plan-do-check-act logic informs the implementation of Kumba's environmental management programme.





Significant quantities of energy are used during blasting

Kumba's environmental management strategy and focus areas

2010

- ENERGY MANAGEMENT**
 - 6% savings on CO₂ emissions
 - 9% savings on energy
- WATER MANAGEMENT**
 - Water management action plans
 - 2.5% improvement on 2009 savings
- LEGACY/HISTORICAL CONTAMINATION**
 - Groundwater contamination from hydrocarbons
 - Shade net trails and comprehensive rehab strategy
- COMPLIANCE**
 - Ongoing licensing activities
 - Comprehensive compliance audits
 - EMS development at Kolomela

2011

- ENERGY AND CO₂ EMISSIONS MANAGEMENT**
- WATER MANAGEMENT**
- ASSURANCE**
- REMEDIATION AND POLLUTION PREVENTION**
- LAND MANAGEMENT**

ENERGY

CHANGE IN APPROACH

Kumba is realigning its energy management programme to align with Anglo American's revised requirements. Kumba originally committed to different savings targets with regards to energy efficiency incorporating targets set by the Energy Efficiency Accord, by Eskom and targets set internally. The main target was determined by the Energy Efficiency Accord, as follows: energy and CO₂ targets are reductions of 1.5% and 1% per annum respectively over a 10-year period based on 2004 energy consumption.

These targets were set without taking changing mine conditions into consideration. Intensity targets meant if consumption increased through factors other than increasing final product, the targets could not be met. The operations tried to manage this by introducing baseline modifications using the footprint model. The model was used to modify consumption by adding factors of production and uncontrollable variables (e.g. haul distance, stripping ratio, yield). Efficiency improvements became demonstrable.

Unfortunately the model had disadvantages:

- It needed to be constantly adjusted to factor in changes at the operational level
- The model only allowed for one uncontrolled variable per operational area
- The above resulted in savings being lost when too many operational changes took place

Based on these and other factors, Anglo American decided to develop a clear policy and strategy on energy and climate change. Initial focus will be on performance improvement, followed by innovation in order to reduce consumption and emissions.

The first phase of the strategy is focused on becoming disciplined and includes the following elements:

- Roll out of a metering, monitoring, reporting, target setting and verification programme that will determine carbon and energy performance management standards and will be used to set targets
- Ensuring that the cost of carbon informs business decisions
- Using regional climate models to identify key site adaptation requirements
- Evaluating value-added services, including synergy and product market risks and opportunities
- Cooperating with government and industry to examine responsible carbon policies.

The next phase – the proactive period – is the medium term focus of the strategy where piloting inroads on carbon and energy savings should become the norm. Therefore the focus will be on new techniques and new technologies. Key elements of this period will be:

- Use of carbon markets to minimise cost of compliance
- Factoring of climate adaptation measures into business plans
- Formation of low-carbon technology partnerships with key stakeholders
- Implementation of carbon offset projects
- Investing in energy and carbon saving projects.

The final phase, building resilience, is the long-term focus of the strategy where breaking new ground will take place. Key elements are as follows:

- Partnering with stakeholders on carbon reducing projects
- Embedding carbon and energy savings culture in the workforce
- Investing in low carbon technology innovation.

NEW APPROACH

The new programme is used to develop "bottom-up" site energy and carbon targets. A business as usual (BAU) baseline is established looking at energy consumption/carbon emissions from the present with a forecast to 2020. This BAU baseline must take into consideration factors such as the life-of-mine plan, increase in production and increase in activities that will result in higher energy consumption/emissions.

The site carbon abatement cost curves must be established taking into account opportunities in:

- energy efficiency
- asset optimisation and supply chain
- new technology and synergy projects
- carbon offsets

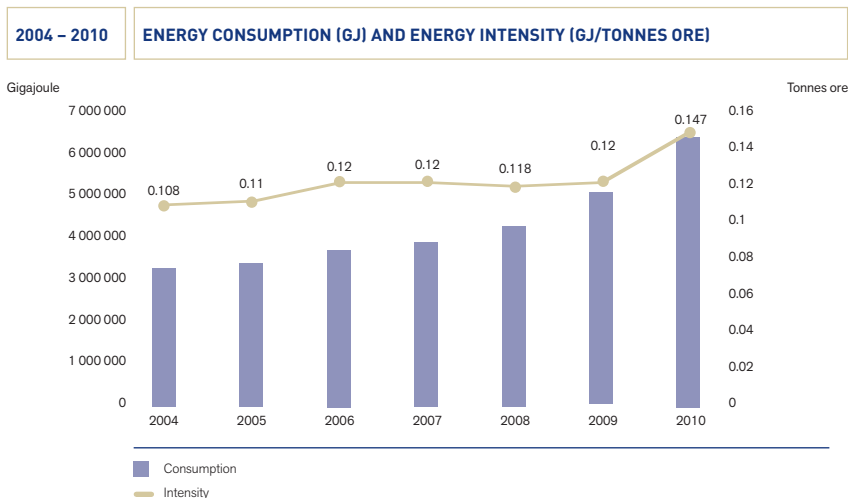
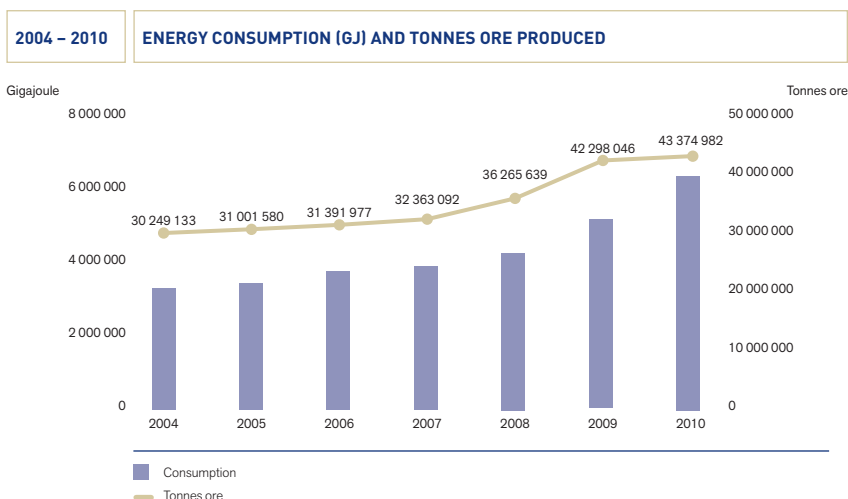
These results can then be used to determine what savings will be possible and the cost implications thereof and the information can be used to set a realistic site specific target.

If energy and emission savings targets are set from the top down, the new programme can be used to:

- determine the least cost option to meet
 - (a) the site targets and
 - (b) the group's indicative carbon target
- determine the site and BU cost implications and/or incentives required to achieve targeted energy and carbon savings

Energy consumption data 2009 and 2010

Operation	2009		2010		2010
	Fuels consumed	Electricity purchased	Fuels consumed	Electricity purchased	Total energy use
Sishen	3 128 572 GJ	1 526 461 GJ	3 781 282 GJ	1 704 514 GJ	5 485 796 GJ
Thabazimbi	300 397 GJ	108 315 GJ	420 383 GJ	101 174 GJ	521 557 GJ
Kolomela	0	0	336 372 GJ	21 553 GJ	357 925 GJ
Total	3 428 969 GJ	1 634 776 GJ	4 538 037	1 827 241	6 365 278



Performance

The total amount of energy consumed by Kumba in 2010 is higher than that consumed during 2009. The total absolute consumption increased during the year. This increase is due to the increase in waste stripping which took place at all three operations. Thabazimbi Mine is in the process of opening a new pit and Kolomela Mine was included in the energy performance reporting for the first time in 2010. Energy efficiency for the year was 0.147 gigajoule per tonne of ore produced (2009: 0.120).

ELECTRICITY SAVING INITIATIVES

Dust suppression

Installation of a new dust suppression system started in early 2010 at Sishen Mine. Altogether 83% of the anticipated electricity savings from this project were realised by the end of the year. The savings were as a result of the new suppression system having smaller motors than the old extraction system. The final units will be fully commissioned by the end of January 2011. Upon verification of the savings, Kumba will receive up to R2 million of funding from Eskom as part of its demand-side management programme.

Solar water heating

Sishen Mine is installing solar water heaters (SWH) as part of its hostel conversion process. A total of 77 units were installed during the second half of 2010. Energy savings realised from the installation do not accrue to the mine, but the carbon emissions saved will be offset from the mine's carbon footprint. Eskom will recognise the energy savings when negotiating for electrical supply for growth projects as they recognise savings achieved outside of the mine environment. The calculated savings have not been verified but are estimated to be about 140 525kWh per annum or 144 740 tonnes of CO₂ per annum.

Heat pumps

Installation of heat pumps at the Thabazimbi Mine change houses was completed during the year. Measurement and verification of the savings will be done in early 2011. Eskom agreed in a meeting held in December 2010 to partially fund heat pumps at the Sishen Mine change houses. This project will start in 2011.

LED lighting

LED lights were investigated in 2008 but high capital cost and poor light output resulted in a decision not to continue with this technology. Due to improvements in LED technology, a decision was made in 2010 to look at it again. LED lights from two different manufacturers were installed in offices at Sishen Mine for testing. Evaluations showed that the new generation LED lights supply adequate lighting. Eskom agreed to provide partial funding for the installation of LED lighting.

Dense medium separation (DMS) plant simplification

In 2009 the standard lump ore DMS flow line of the plant at Thabazimbi Mine was simplified by combining the dense medium and densifier lines and by removing some equipment from the diluted medium line. A unique arrangement was used to feed the densifier by gravity. This has reduced ferrosilicon consumption, water consumption and energy consumption. The same modification is currently under way in the fine ore line in the cyclone plant. Possible savings will be quantified.

Diesel savings initiatives

The Diesel Energy Efficiency Management System (DEEMS) contract was renegotiated and renewed in 2010. The system was used during 2010 to track diesel performance and to log and track interventions. The DEEMS system is reporting a saving of 1 494 693 litres for the year 2010.

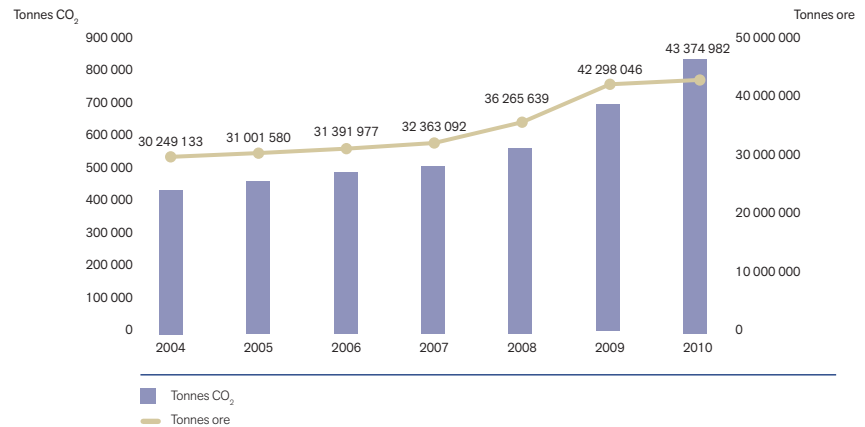
GREENHOUSE GAS EMISSIONS

Performance

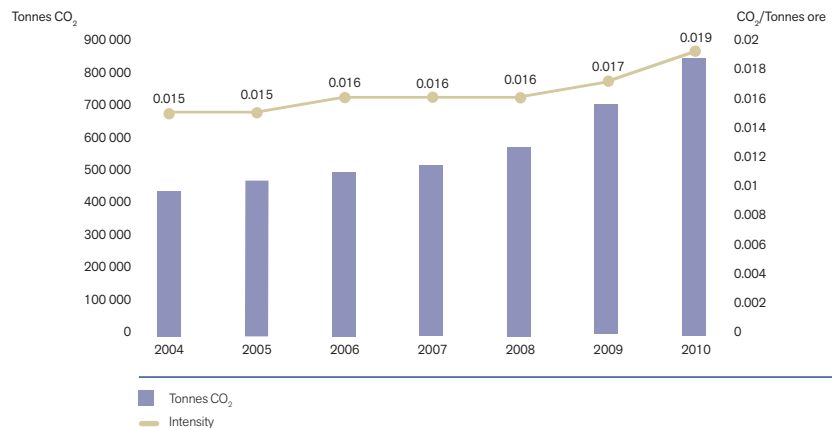
Greenhouse gas (GHG) emissions increased at Kumba in 2010 mainly as a result of the increase in waste stripping and the resultant increase in energy consumption. GHG intensity increased marginally from 0.017 tonne CO₂/tonne in 2009 to 0.019 tonne CO₂/tonne during 2010.

Operation	CO ₂ from fossil fuels	CO ₂ from electricity purchased
Sishen Mine	265 353.79	487 680.28
Thabazimbi Mine	29 483.51	28 946.95
Kolomela Mine	23 613.60	6 166.54
Total	318 450.90	522 793.77

2004 – 2010 TONNES CO₂ EMITTED AND TONNES ORE PRODUCED



2004 – 2010 CO₂ EMITTED (TONNES) AND CO₂ INTENSITY (TONNE/TONNE ORE PRODUCED)



WATER

Kumba's water management strategy is informed by the intention to ensure all operations practice locally responsible water stewardship. While aligned to Anglo American's overall and long-term goals for water stewardship, local and incremental saving targets will be built bottom up, taking into consideration the presenting catchment water stress conditions. Apart from efficiencies or water-use intensities, consideration is given to reusing, recycling and water harvesting.

SISHEN MINE

Sishen achieved the previous year's water use intensity target. At the beginning of 2010, a target was set to achieve a saving of 2.5% improvement on the previous year's water-use efficiency. The target for Sishen translated to 175 l/t on average and during 2010, the mine performed at 169 l/t. The mine achieved its target with an average intensity of 169 l/t for the year. The total water consumption for mining and beneficiation purposes was in the order of 7,48 giga litres, amounting to an average use of 20,5 Ml per day.

A number of water savings initiatives are under way at the mine, including the following:

- Installation of automated water meter loggers to provide extra information about water flows in the pipe network.
- Improvement of dust suppression methods on mining haul roads
- Construction of a dirty water reservoir – prefeasibility stage.

- Construction of a clean water reservoir – conceptual stage.
- Additional water storage for process water – conceptual stage.

THABAZIMBI MINE

Thabazimbi Mine received its water-use licence in October 2010.

The 2010 target of 540 l/t was not achieved with average water-use intensity for 2010 being measured at an average of 802 l/tonne. Thabazimbi's disappointing water intensity was attributed to old infrastructure, lower than planned production, challenges with slimes density and associated return water facilities. The mine is in the process of implementing measures to reduce water consumption and improve efficiencies.

The total water consumption at Thabazimbi Mine for 2010 was in the order of 2,06 giga litres (or an average use of 5,6 Ml per day).

Several projects are under way to reduce water consumption at Thabazimbi Mine.

These include:

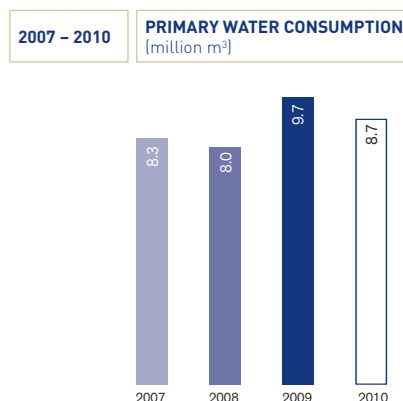
- Upgrading of water metering systems
- Slimes dam return water system upgrade
- Upgrade of plant water recovery system
- Installation of auto shut-off valves in the washing and screening plant

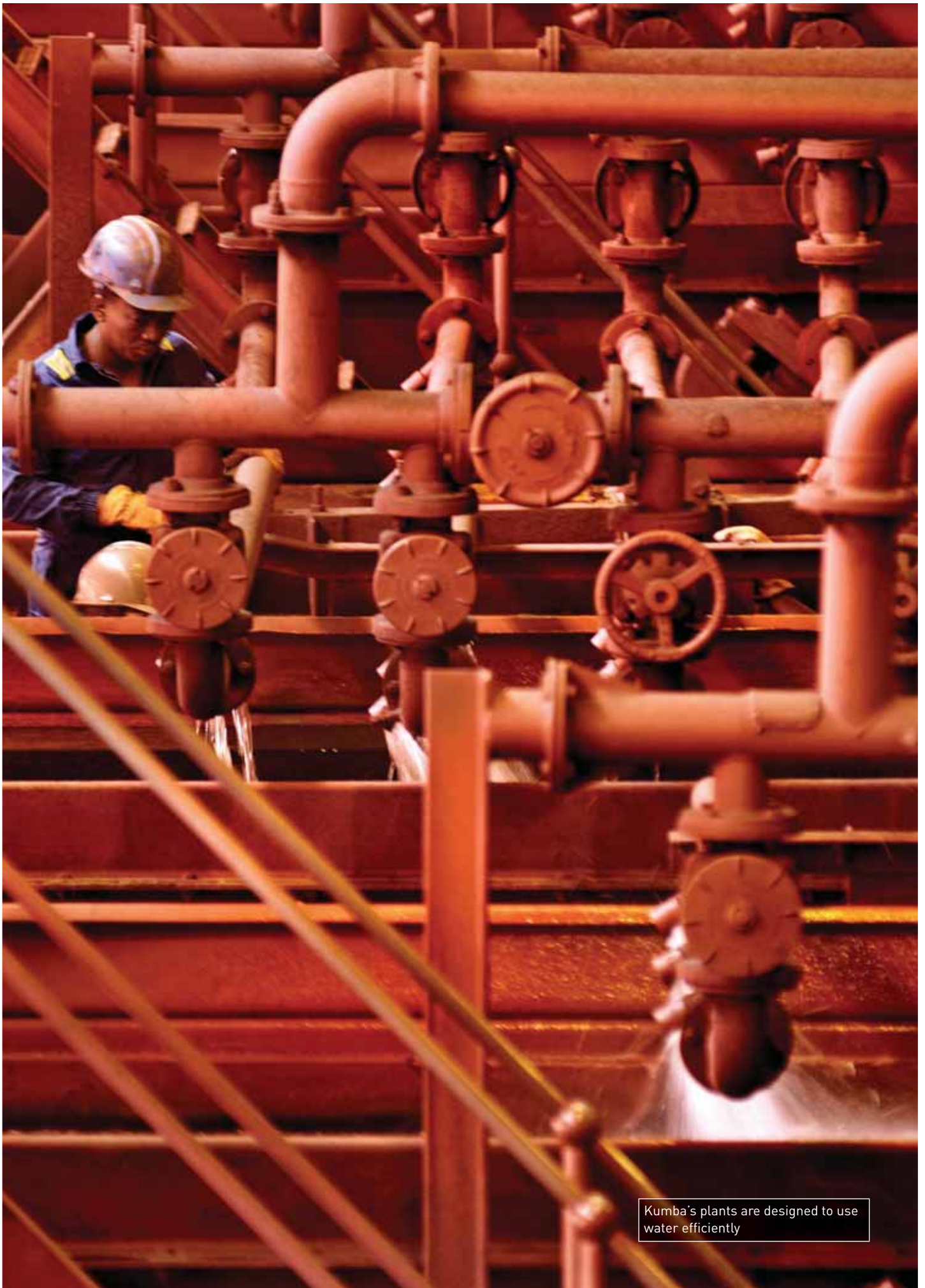
- Improvement of controls on the density of slimes being pumped to the slimes dams
- Improvement in the efficiency of drying bins
- Infrastructure for making increased use of treated effluent from municipal waste water treatment works

KOLOMELA MINE

The dewatering infrastructure at Kolomela Mine is in the final stages of commissioning. During the year 1 226 000 m³ of water was exported by the mine to the Sedibeng Water Board. The water was extracted as part of the mine's dewatering programme.

All of Kumba's operations have approved integrated water-use licenses in place.





Kumba's plants are designed to use water efficiently

LAND AND REHABILITATION

Land management at Kumba encompasses three interconnected elements: waste rock dump rehabilitation, the management of land other than that used for mining, and closure planning and financial provision.

WASTE ROCK DUMP REHABILITATION

Sishen Mine revised its rehabilitation strategy based on the need for a new approach to rehabilitation. Specific focus is placed on the identification of areas that can be rehabilitated before mine closure and the formulation of a methodology that will maximise opportunities for concurrent rehabilitation.

A task group was established during 2010 to investigate the best practicable means of maximising rehabilitation opportunities at Sishen Mine and to develop a comprehensive rehabilitation strategy. Key outcomes of the task team's efforts include a SWOT analysis, a risk assessment, identification of rehabilitation options to be applied to existing dumps and to future dumps, with specific focus on five-year and life-of-mine rehabilitation options.

The revised strategy will be presented to the Kumba executive committee in early 2011. Sign-off of the strategy is vital given the limitations of the current rehabilitation plan and the significant increase in the closure liability costs. The focus for 2011 is to implement the approved rehabilitation strategy.

Thabazimbi Mine's rehabilitation is progressing according to plan. The mine's waste rock dump rehabilitation entailed the planting of between 7 000 and 8 000 trees, shrubs and grasses on the waste rock dumps in the Donkerpoort pit area. Prior to planting, approximately 512 000 tonnes of material had to be moved to prepare the area for rehabilitation. The DMR indicated satisfaction with rehabilitation results during a visit to the mine in August 2010. The focus for 2011 is to continue with the approved rehabilitation method according to plan.

LAND MANAGEMENT

Kumba has developed an integrated approach to identifying potential environmental and social impacts of new projects. The approach is intended to improve consistency and effectiveness in mitigating such impacts. It also applies to projects that seek access to sensitive areas. Thabazimbi and Sishen Mines have biodiversity action plans (BAPs) which were peer reviewed by Anglo American. Both mines are addressing the findings of the peer reviews. At Kolomela Mine, potential impacts on sensitive areas, such as pans, have been identified and mitigation plans have been developed to conserve or restore areas that will be impacted upon.

During the year, Sishen Mine compiled a Biodiversity Action Plan to be used in part to manage those areas of mine land that are earmarked for low intensity game farming. These areas include the mine's eastern farms Lylyveld and Sekgame, approximately 1 000 ha in size. All cattle, in excess of 800 animals, and horses previously kept on this land were sold at a public auction in August 2010 in line with the approved land management strategy.

The management and control of alien and invasive species on the mine and on its farms continues as scheduled. Farmworkers previously responsible for livestock management now form part of a team responsible for the eradication of invasive species.

A major biodiversity focus of the mine will be on determining the potential impact the mine has on vegetation especially the iconic camel thorn (*Acacia erioloba*). This issue was raised by stakeholders, auditors and authorities as a concern. The mine initiated a detailed study to evaluate the impact of mining activities on biodiversity. Relevant stakeholders, including the local community, local farmers, research institutions, academia, government and conservation agencies, were identified and approached to form part of the Biodiversity Working Group. The terms of reference for the study was developed by all stakeholders during 2010 and investigations will continue during 2011.

The entire Thabazimbi Mine is located on a farm, part of which is mined and the remainder of which is used for nature conservation purposes. A lodge located within the Ben Alberts Nature Reserve, situated on mine land, is being converted into a tourist facility which will endure post-closure (current life-of-mine extends until 2016). A detailed risk assessment was completed in this regard.

Kolomela Mine is compiling a comprehensive biodiversity management programme for completion during 2011, the outcomes of which will be integrated into the final approved land use plan.

During 2011 Anglo American and Fauna and Flora International will conduct a review of the BAPs of Sishen and Kolomela Mines, due to the sensitivity of some areas within the mine, and to implement and incorporate recommendations from the review into the BAP.

CLOSURE PLANNING AND FINANCIAL PROVISION

Sishen and Thabazimbi Mines developed their preliminary closure plans inline with the Anglo American Mine Closure Toolbox. Kolomela Mine will be developing its preliminary closure plan during 2011.

Detailed closure cost estimates exist at all the mines and are reviewed on an annual basis. Quarterly contributions are made by the mines into the Kumba Rehabilitation Trust. A key 2010 milestone was the provision of the shortfalls for both Thabazimbi and Kolomela Mines, which was deposited into the fund as agreed with DMR, and the issuing of the bank guarantee to DMR for Sishen Mine. The mine's closure cost estimates were audited by KPMG and action plans were developed to address areas of improvement. As at 31 December 2010, the total investment held by the Kumba rehabilitation trust was R372 million. This money is set aside for environmental rehabilitation and decommissioning, as required by law. Further details can be found on pages 36, 37, 40, 48 and 53 of the 2010 Annual Financial Statements.

DUST PARTICULATE EMISSIONS

Kumba's primary concern with regards to air quality is the amount of dust generated by its activities. The main sources of dust are the plants (transfer points, extraction systems, open areas and roads) and mining areas (mine and contractor haul roads). To manage its impacts and to ensure that it fulfils its legal obligations with regards to dust emissions, Kumba has implemented a

monitoring programme which measures total suspended particulate (nuisance dust) and PM10 (particulate matter not exceeding 10 µg/m³ of inhalable dust). Air quality management plans (AQMP) are in place at all the mines and are implemented on an ongoing basis. Oversight for the implementation of the plans rests with operational Dust Task Teams.

In 2011, the focus will be on optimising the dust control programme in mining areas (water truck utilisation, dust suppressants, etc.), implementing real-time PM10 and 2.5 monitoring (residential areas and in-pit monitoring) and proactively engaging with internal and external stakeholders on the mine's impacts and control measures.



Kumba's land management strategy involves the clearing of the swarthaak (*Acacia mellifera*), a species which encroaches rapidly on grazing and arable land