

## Sishen Mine



(Mt)	2007	2006	2005
Production	29.7	28.7	28.5
Overburden mined	65.5	59.3	58.6
Run-of-mine pit production	39.0	31.2	31.7
Stripping ratio (times)	1.68	1.90	1.85
Run-of-mine plant feed	34.5	32.4	31.8
Plant yield (%)	86.0	87.1	89.4
<b>Cost per tonne</b>			
Total cost (R)	79.9	77.9	76.9
Cash cost (R)	74.3	69.9	68.8
<b>Sales</b>			
Export	24.2	21.5	22.1
Local	6.5	5.9	6.6
<b>Total sales</b>	<b>30.7</b>	<b>27.4</b>	<b>28.75</b>
<b>Safety</b>			
Lost-time injury frequency rate per 200,000 hours	0.23	0.22	0.29
Fatalities	1	1	–

### Operational activities

For the year to 31 December 2007 Sishen Mine recorded 29.7Mt of final product, breaking the record it set in 2006 of 28.7Mt.

Corrective action to address the unusual number of injuries in the first quarter paid off and the mine maintained its lost-time injury frequency rate (LTIFR) at 0.23 in 2007. Most regrettably, there was one fatality in a heavy vehicle incident at the mine in February 2007. We extend our deepest condolences to the family and friends of Mr Samuel Marutle, and reaffirm our commitment to reach our target of a zero-injury workplace.

The drive to improve performance and achieve real cost savings across the value chain continued during the year, with notable results. Best practices were established in tyre management, fuel and lubrication management and explosives. In addition, Kumba capitalised on shared purchasing opportunities with its major shareholder and spearheaded an initiative on optimising the use of fuels and lubricants. These and other initiatives resulted in savings of R199.6 million for the year, bringing Sishen Mine's unit cost of production to R79.90 per tonne compared to R77.93 per tonne in 2006, an increase of just 2.5% despite inflationary pressures and considerably more mining activity in a larger pit and in preparation for expansion.

In 2007, prudent use of contractor capacity enabled Sishen Mine to manage longer travel distances, a deeper ore body and increased production volumes. Some 39.6Mt of waste was handled by contractors during the review period, 41% above 2006 following the creation of additional facilities to manage the rising waste volumes generated by a deepening ore body. Snowden Mining Consultants carried out a study to determine the most cost-efficient method of removing waste from the pit. In-pit crushing and conveying systems were evaluated against the current mining fleet and a fleet of larger mining equipment. The outcome of the study will become part of Sishen Mine's future equipment plan.

The ongoing focus on continuous improvement and "lean production" principles remains an important management tool to improve efficiencies and margins. Material efficiency improvements were again achieved in a number of areas, notably in selective mining, where an increased plant yield of 5% reflected improved use of the ore body. With selective mining, the most appropriate equipment is used to supply the optimum volumes and quality of feedstock to the beneficiation plant. Correctly managed, this is an efficient means of producing run-of-mine material by eliminating waste.



Continuous improvement initiatives include reducing scheduled maintenance stoppages, while increasing the availability of the total production line. This improved maintenance planning process created additional production capacity of 386,154 tonnes during the year without incurring any capital costs. The maintenance teams continually examine routine work management, and review the maintenance strategy of critical equipment and related spare parts to optimise equipment availability.

Despite all the initiatives to improve efficiencies and margins, production costs remained under pressure as discussed in the financial review (p30).

Undoubtedly, for Sishen Mine, the major highlight and challenge of the period was the R5.1 billion Sishen Expansion Project (SEP)

that will produce 13Mtpa at full capacity to increase annual production from Sishen Mine to 42Mtpa and lower overall unit cost. Importantly, from a sustainability perspective, much of SEP's production will be in beneficiating product that was previously considered waste.

While the mechanical aspects of SEP were substantially complete by 30 June 2007, the start of production was behind schedule due to earlier engineering difficulties caused by skills shortages, capacity constraints and late deliveries by suppliers. There have been other delays caused by industrial action and critical mechanical failure in the crushers. Full ramp-up to design capacity is expected during 2008.

## Management team

**1 Christine de Beer**  
Supply manager (47)  
BCom (Strategic Management)

**2 Chris Minnie**  
Manager plant (40)  
B(Eng)(Ind), MBL

**3 Hannes Cronje**  
Manager mining (34)  
BEng (Mining)

**4 Marthina Alchin**  
Manager business improvement (49)  
MSc (Min Engineering), MBA

**5 Paul Hibbert**  
Manager finance (42)  
CA(SA)

**6 Retief Louw**  
Acting general manager (44)  
BEng (Elec), Diploma Datametrie (Information Systems), MEM (Masters in Engineering Management)

**7 Anisaan Naidoo**  
Acting resident engineer (29)  
BSc Eng (Mech)

**8 Kobus Meyer**  
Manager human resources (52)  
MCom (Human Resources Management)

**9 Theo Kleinhans**  
Operations manager (57)  
MSc (Chemical)

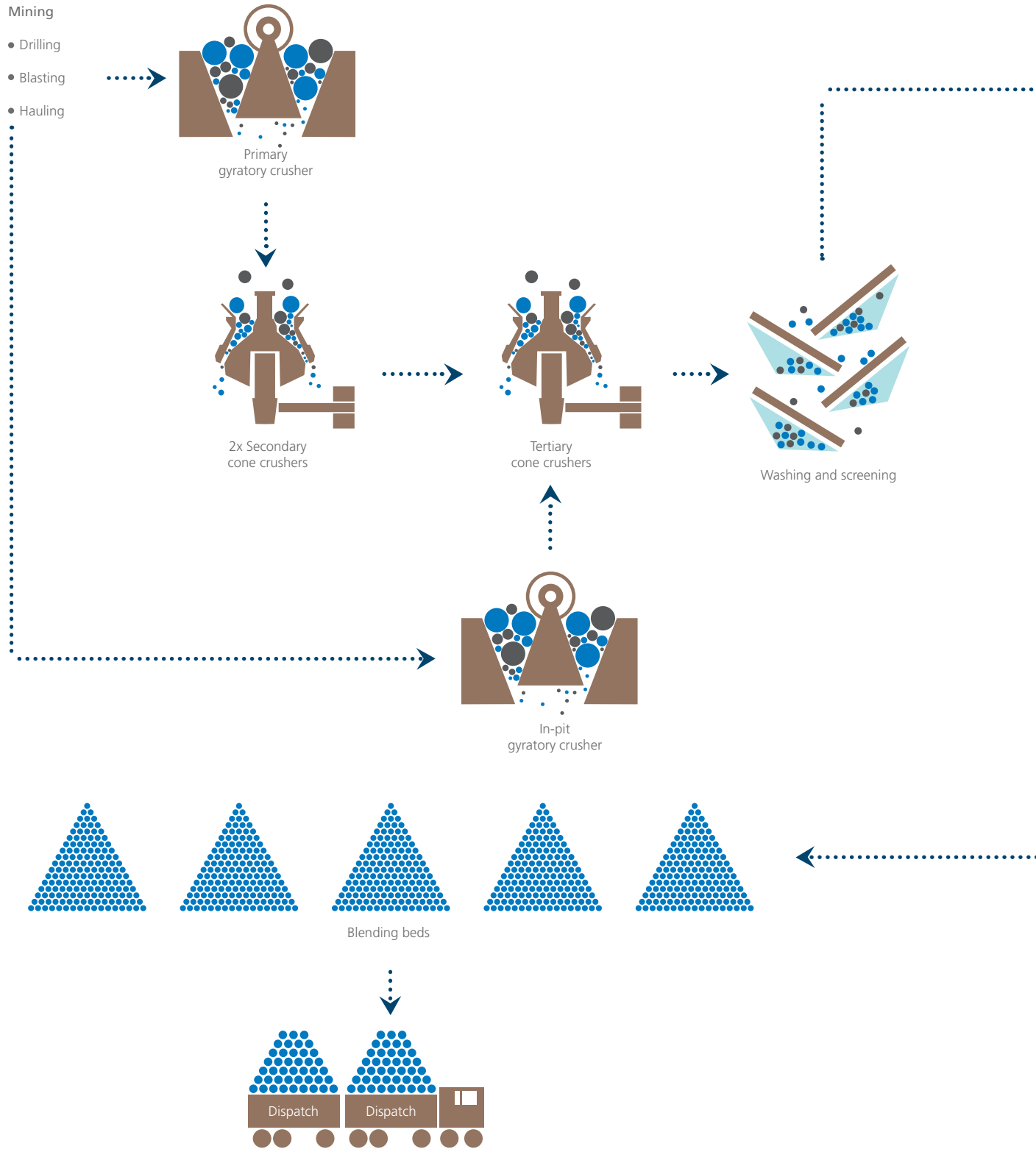
**10 Witness Kwaza**  
Manager safety, health and environment (48)  
Dip (Modern Safety Management), Management Dip

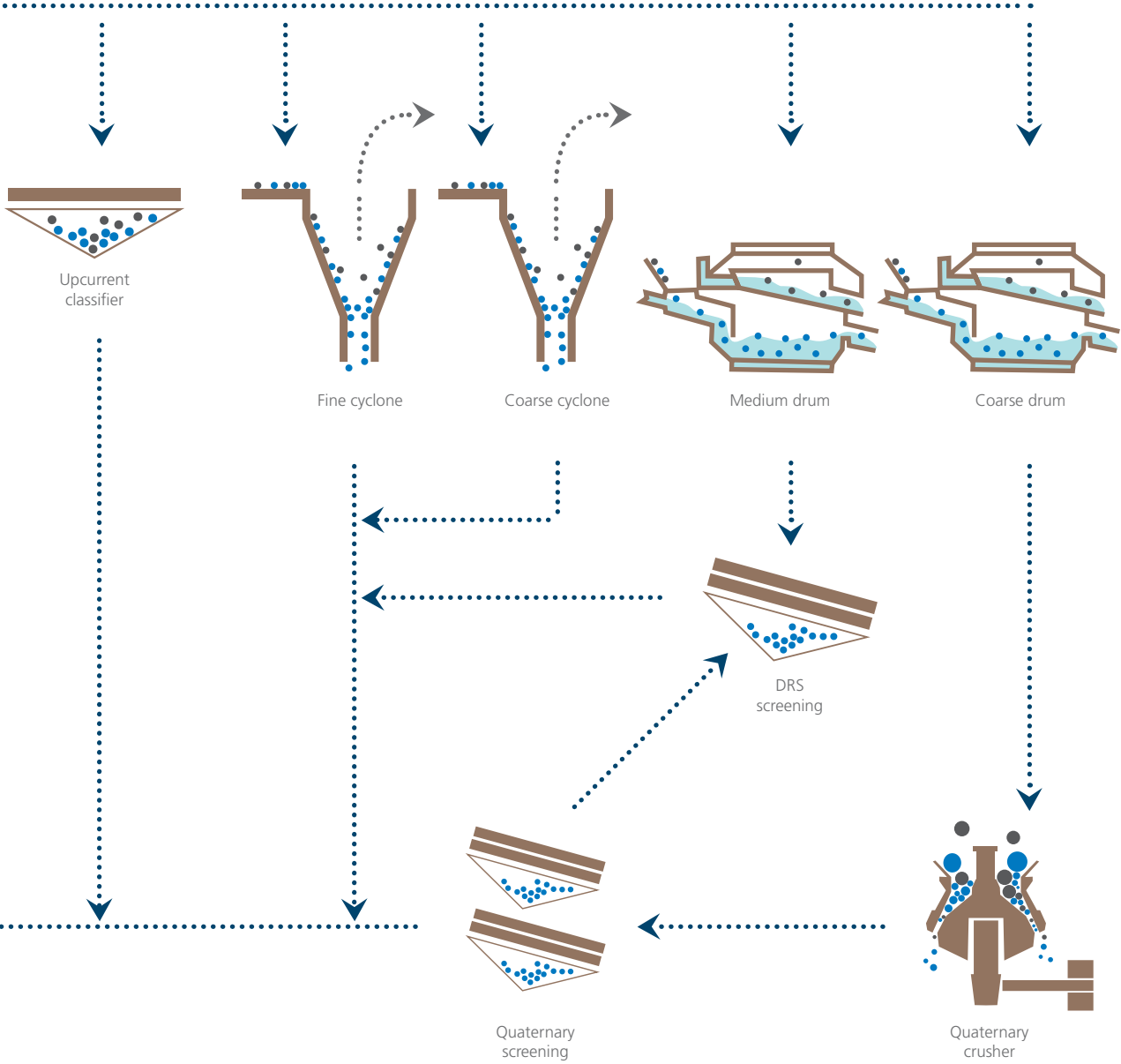
**11 Anel Marais**  
Manager sustainable development (35)  
BPrim Ed

# Sishen Mine's beneficiation process flow

Mining

- Drilling
- Blasting
- Hauling





## Sustainability

Two features of Sishen Mine stand out: firstly, its physical size and secondly the impact – socially, environmentally, economically – of this mine.

From an environmental perspective, the scale of this footprint has consequences on land management, especially rehabilitation and biodiversity, groundwater management and the efficient use of resources in terms of mining and processing.

Socially and economically, the mine's impact is significant. It is the Northern Cape's largest employer and a major trainer of artisans in the country; it uses 75% of the dedicated 861km-long Sishen-Saldanha railway line and export facilities.

Challenges	Management intervention
<b>Environmental:</b>	
Rehabilitation	Studies and experiments to determine the best rehabilitation technique for mine rock waste dumps have been running for the past four years and were completed at the end of 2007. Consultation with the Department of Minerals and Energy (DME) on approval of the preferred option and updated mine closure cost estimates related to the physical environment have begun. Socio-economic and bio-physical components will be completed in 2008.
Dust	Dust is controlled through a chemical suppression process.
Dewatering	Studies are being conducted to determine the impact zone of dewatering activity on neighbouring farmers. Sishen Mine maintains ongoing consultation with affected farmers and the Department of Water Affairs and Forestry (DWAF). Where required, the mine assists affected farmers with water supplies.
Resource use and efficiency	There is ongoing investigation and implementation of more efficient technologies to reduce water and energy consumption, and consequently emissions and waste.
<b>Socio-economic:</b>	
Lack of skilled artisans	The mine dedicates substantial resources to train and retain artisans. Its training centre is one of the few fully accredited institutions in the country that provides valuable theoretical and practical training for its own needs and for others.
Home ownership	New developments include an evaluation of home affordability, and the implementation of employee assistance programmes to promote home ownership. The hostels in Kathu are being converted into bachelor flats; employees are encouraged to bring their families to Kathu.
Local economic development	There is ongoing consultation with local and district municipalities to support integrated development plans. Community development projects are continually identified, and form part of the mine's social and labour plan, which is aligned to local government's integrated development plan and local economic development strategy.



The SEP plant at Sishen Mine uses material previously classified as waste.