



# South Africa Vaal River

## Message from Robbie Lazare

AngloGold Ashanti's South African operations have seen much change at both a corporate and operational level over the past decade, not least of which has been the sale of assets and the renaming of operations and, indeed, of the holding company to AngloGold Ashanti Limited.

Change has been present around our operations too – the continued transformation of our country, the ongoing downsizing in our industry and the wavering confidence of many in the future of the mining industry in South Africa, all of which is affecting the economic prosperity of the communities in which we live. This has been exacerbated in recent times by the prevailing strength of the rand against the United States dollar which has resulted in a declining revenue base in rand terms and consequently placed greater pressure on margins at an operational level. The impact of these developments has been felt not only in those communities immediately surrounding our operations but has also extended to those rural communities from which the vast majority of our workforce is still drawn. My message to the many stakeholders in our company is that, yes, times are tough in our industry, the South African gold mining industry is not the force it once was and our own company employs fewer people and produces less gold at its South African operations than it once did, but this needs to be seen in context.

South Africa remains the most significant gold producer in the world. AngloGold Ashanti's South African operations remain the mainstay of the group, having produced 51% of AngloGold Ashanti's gold in 2004. Of the group's total mineral resources and ore reserves, 54% and 49% respectively are held in this country. The group's capital expenditure of R2.089 billion (\$337 million) in 2004, which accounts for 52% of the group's total, is a good indicator of the confidence that management and board have in the long-term viability and importance of its operations. The Moab Khotsong mine in the Vaal River area is the largest of AngloGold Ashanti's current projects and involves the sinking, construction and equipping of the shaft system to a depth of 3,130 metres below surface. The project is expected to produce 4.9 million ounces of gold over 12 years and to reach commercial production in 2006. The total capital cost for this project is R3.63 billion (\$585 million); capital expenditure in 2005 alone will be of the order of R490 million (\$79 million).

Yet while we are planning production going forward we have also got better at attending to those issues that are important to our employees and their communities. We have for the second year produced a Report to Society which details those aspects of our business relating to economic performance and development, to safety and health and the environment, to community issues, to our labour practices and to how we deal with public health threats such as HIV/AIDS. This report is available on our website or in a printed form on request.

This regional report draws from the Report to Society some of those issues which are most pertinent to the Vaal River operations. While this report is not an exhaustive account of what we do, it provides some insight into how we address some of these issues, and how we believe that we and our employees live the values that we have collectively agreed upon.

While we maintain the well-known view that the "business of business is business", we also believe that business has an important role to play – particularly in South Africa – in bringing about economic development, in supporting the welfare of our communities and in driving the transformation of our still-new democracy.

**Robbie Lazare**  
Executive officer (South Africa Region)



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### About this report:

AngloGold Ashanti is committed to reporting to a broad range of stakeholders. In addition to its operational and financial performance the company also reports on its economic, social and environmental performance – the so-called triple bottom line. This country profile forms part of a broader group Report to Society, which is available on the company's website or from the contacts detailed below.

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## 2 | Introduction

AngloGold Ashanti's underground mining operations in South Africa are located in two geographic areas on the Witwatersrand Basin: the West Wits and the Vaal River area. This fact sheet focuses on the operations in the Vaal River area.

The Vaal River operations are located near the towns of Klerksdorp and Orkney, in North West Province and Free State, and include the deep-level mines of Great Nologwa, Kopanang, and Tau Lekoa as well as

Moab Kotsong which is under development. The Vaal River complex also has four gold plants, one uranium plant and one sulphuric acid plant. The Vaal River processing plants include crushers, mills, CIP and electro-winning facilities, and are able to treat between 180,000 and 420,000 tonnes of ore per month. Although the Vaal River operations produce uranium oxide as a byproduct, the value is not significant relative to the value of gold produced.

## Geology of the Witwatersrand Basin

The Witwatersrand Basin comprises a six-kilometre thick sequence of interbedded argillaceous and arenaceous sediments that extend laterally for some 300 kilometres north-east south-west and 100 kilometres north-west south-east on the Kaapvaal Craton. The upper portion of the Basin, which contains the orebodies, outcrops at its northern extent near Johannesburg. Further west, south and east the Witwatersrand Basin is overlain by up to four kilometres of Archaean, Proterozoic and Mesozoic volcanic and sedimentary rocks. The Witwatersrand Basin is late Archaean in age and is considered to be around 2.7 to 2.8 billion years old. In the Witwatersrand Basin, gold occurs in laterally extensive quartz pebble conglomerate horizons or reefs that are generally less than two metres thick and are widely considered to represent laterally extensive braided fluvial deposits. Separate fan systems were developed at different entry points and these are preserved as distinct goldfields. There is still much debate about the origin of the gold mineralisation in the Witwatersrand Basin. Gold was generally considered to have been deposited syngenetically with the conglomerates but there has been a swing to an epigenetic theory of origin. However, the most fundamental control to the gold distribution in the Basin remains the sedimentary features, such as facies variations and channel directions. Gold generally occurs in a native form associated with pyrite and carbon, with quartz being the main gangue material. The reefs mined at the Vaal River operations are the Vaal Reef, the Ventersdorp Contact Reef (VCR) and the "C" Reef.

- The Vaal Reef contains approximately 85% of the reserve tonnage with mining grades between 10 and 20g/t. It comprises a series of oligomictic conglomerates and quartzite packages developed on successive unconformities. Several distinct facies have been identified, each with its unique gold distribution and grade characteristic.
- The VCR has a lower grade than the Vaal Reef, and contains approximately 15% of the estimated reserves. The economic portion is mainly concentrated in the western part of the lease area. It can take the form of a massive conglomerate, a pyretic sand unit with intermittent pebble layers or a thin conglomerate horizon. The reef is located at the contact between the overlying Kliprivierberg Lavas of the Ventersdorp Super Group and the underlying sediments of the Witwatersrand Super Group which creates a distinctive seismic reflector. The VCR is located up to one kilometre above the Vaal Reef.
- The 'C' Reef is a thin, small pebble conglomerate with a carbon-rich basal contact, located approximately 270 metres above the Vaal Reef. It has less than 1% of the estimated reserves with grades similar to the Vaal Reef, but more erratic. The most significant structural features are the north-east striking normal faults which dip to the north-west and southeast, resulting in zones of fault loss.

## Great Nologwa

**Ownership:** 100% owned by AngloGold Ashanti

**Location:** Great Nologwa is one of four mines comprising the Vaal River region. Located on the Free State province side of the Vaal River, Great Nologwa adjoins Kopanang and Moab Khotsong.

**Geology:** The reefs mined at Great Nologwa are the Vaal Reef and the 'C' Reef, with the Vaal Reef accounting for by far the largest portion of the mineral resource here. The Vaal Reef has a distinct high-grade zone with an average grade of 23g/t, trending north to south. Mining is steadily moving out of the high-grade zones and grades are expected to decline gradually.

**Mining and processing:** Great Nologwa, which employs a scattered mining strategy owing to the complexity of the ore, operates a twin-shaft system serving eight main levels at an average depth of 2,400 metres. Access to the reef is from the footwall haulage and return airway development, with cross-cuts developed every 180 metres to

Great Nologwa			
		2004	2003
<b>Gold production</b>	000oz	795	812
<b>Total cash costs</b>	\$/oz	231	193
<b>Total cash costs</b>	R/kg	47,820	46,468
<b>Total production costs</b>	\$/oz	260	213
<b>Total production costs</b>	R/kg	53,781	51,217
<b>Capital expenditure</b>	\$ million	36	42
<b>Capital expenditure</b>	R million	235	315
<b>Total number of employees</b>		7,100	7,821
Employees		6,192	6,819
Contractors		908	1,002

the reef horizon. Raises are then developed on-reef to the level above and the reef is stoped out on strike with an average stope width of 150 centimetres. Approximately 4,000 metres of development is completed each quarter. As the orebody is narrow and tabular in nature, the production rate is measured in square metres mined and averages 35,000m<sup>2</sup> per month. Panels are on average 26 metres long.

The Vaal River complex has four gold plants, one uranium plant and a sulphuric acid plant. These plants incorporate crushers, ball mills, carbon-leach (CIL) and carbon-in-pulp (CIP) and electro-winning facilities.

At the Great Nologwa plant, conventional crushing, screening, semi-autogenous grinding (SAG) and CIL process are followed by milling and

treatment. The Vaal River's No 8 plant is dedicated to Great Nologwa ore and has a nominal throughput capacity of 230,000 tonnes of ore a month.

**Performance in 2004:** Gold production was down slightly by 2% to 795,000 ounces and total cash costs were maintained at \$231 per ounce. In local currency terms, total cash costs rose by 3% to R47,820 per kilogram. Adjusted operating profit fell to \$118 million. Stay-in-business capital expenditure totalled \$36 million, a decrease of 14% on 2003.

**Growth prospects:** As mining moves into lower grade areas, production at Great Nologwa is expected to decrease by 2% to 782,000 ounces in 2005, at a total cash cost of \$256 per ounce. Capital expenditure during 2005 is expected to be approximately \$43 million.



## Kopanang

**Ownership:** 100% owned by AngloGold Ashanti

**Location:** Kopanang is also located on the Free State province side on the Vaal River and adjoins Great Nologwa.

**Geology:** The principal reef mined here is the Vaal Reef with the 'C' Reef, a secondary reef located around 200 metres above the Vaal Reef, being mined on a smaller scale. Given the complex geological units and lateral variations in reef character of the Vaal Reef, several distinct facies have been identified, each with its own unique gold distribution and grade characteristics. At Kopanang in particular, gold is intimately associated with narrow, discontinuous bands of pyrobitumen which are present in the Stilfontein Facies of the Vaal Reef.

**Mining and processing:** Given the geologically complex nature of the orebody at Kopanang, a scattered mining method is used. Access to the orebody is mainly by footwall tunnelling, raised on the dip of the reef and stoped out on strike.

The Vaal River No 9 plant is a milling and treatment process and uses conventional SAG and CIP technology. Kopanang feeds one of the two plant streams with predominantly ore from the Vaal Reef; the other stream is fed exclusively by ore from the Ventersdorp Contact Reef from the Tau Lekoa mine (see below). Both streams are augmented by low-grade ore from the waste dumps.

**Performance in 2004:** Overall, gold production decreased by 2% to 486,000 ounces at a total cash cost of \$281 per ounce. In rand terms, total cash costs rose by 8% to R58,220 per kilogram. Adjusted operating profit totalled \$46 million. Capital expenditure, mostly stay-in-business capital of \$38 million was 15% higher than last year.

Kopanang			
		2004	2003
<b>Gold production</b>	000oz	486	497
<b>Total cash costs</b>	\$/oz	281	223
<b>Total cash costs</b>	R/kg	58,220	53,787
<b>Total production costs</b>	\$/oz	317	249
<b>Total production costs</b>	R/kg	65,460	59,964
<b>Capital expenditure</b>	\$ million	38	33
<b>Capital expenditure</b>	R million	244	248
<b>Total number of employees</b>		6,312	6,966
Employees		5,758	6,131
Contractors		554	835

**Outlook:** In 2005, gold production at Kopanang is expected to decrease by 3% to 471,000 ounces, at a total cash cost of \$327 per ounce. The lower production expected is in line with an anticipated 2% decline in face advance as some complex geology is expected to be encountered. Capital expenditure for the year ahead will be in the region of \$37 million.

## 4 | Tau Lekoa

**Ownership:** 100% owned by AngloGold Ashanti

**Location:** Tau Lekoa, one of four Vaal River operations, is located north of the Vaal River in North West Province

**Geology:** The only reef mined at Tau Lekoa is the Ventersdorp Contact Reef (VCR) which is part of the Ventersdorp Conglomerate Formation. This unit lies between the underlying Central Rand Group sediments of the Witwatersrand Group and the overlying Ventersdorp Supergroup lavas.

**Mining and processing:** Given the geologically complex nature of the orebody at Tau Lekoa, a scattered mining method is used. Access to the orebody is mainly by footwall tunnelling, with access to the reef being facilitated by raising on the dip of the reef and stoping operations taking place on strike.

Tau Lekoa has a twin shaft system and mines to a depth of 1,650 metres.

Tau Lekoa uses hydropower which has a centralised electro-hydraulic system as its primary source of energy production. Hydropower has been instrumental in improving labour productivity, which has played a vital role in assisting Tau Lekoa to achieve its business objectives.

Ore from the Ventersdorp Contact Reef from the Tau Lekoa mine feeds one of two streams at the Vaal River No 9 plant (which uses a milling and treatment process and conventional SAG and CIP technology). Ore from the Vaal Reef from Kopanang feeds the other plant stream. Both streams are augmented by low-grade ore from the waste dumps.

**Performance in 2004:** Gold production at Tau Lekoa decreased to

## Moab Khotsong

**Ownership:** 100% owned by AngloGold Ashanti

**Location:** Moab Khotsong, which is still in development, lies to the south of and is contiguous with the lease area of Great Nologwa. The decision to exploit the mineral resource on the Moab Khotsong lease area was taken in 1989 and development began in 1991.

**Geology:** The mineral resource at Moab Khotsong is structurally complex and highly faulted, with large fault-loss areas. It is one of crustal extension, bound in the north and south by major south-dipping faults with north-dipping faults sandwiched between them. The mineral resource lies between 2,100 metres and 3,700 metres below surface, with only limited quantities of ore lying above 2,300 m.

The principal reef is the Vaal Reef of which the gold grade and morphology are considered to be a down-dip extension to the south and south-east of Kopanang and Great Nologwa mines. The reef comprises an oligomictic conglomerate, where gold is associated with carbon at the base.

The main shaft is collared on the hangingwall side of the Jersey Fault, which forms the northern boundary of the reef blocks. Access development towards the reef blocks will be gained through rocks of the West Rand Group, which included shale, siltstone and quartzite.

**Mining and processing:** Given the size of the shaft pillars, and because they are unable to provide the necessary protection against rock pressures at depth, the new Moab Khotsong shaft was sited in Great Nologwa's lease area. This enabled the extraction of the shaft pillar before the shaft was excavated and equipped – though it did require the development of long access tunnels to the reef.

Operational statistics			
		2004	2003
Gold production	000oz	293	322
Total cash costs	\$/oz	370	263
Total cash costs	R/kg	76,428	63,256
Total production costs	\$/oz	432	304
Total production costs	R/kg	89,168	72,738
Capital expenditure	\$ million	25	16
Capital expenditure	R million	160	124
Total number of employees		4,252	4,139
Employees		3,398	3,450
Contractors		854	689

293,000 ounces. Total cash costs increased by 41% to \$370 per ounce, or by 21% to R76,428 per kilogram in local currency. The mine's adjusted operating profit reduced to a loss of \$6 million in 2004. Capital expenditure of \$25 million was 56% higher than in 2003, mainly stay-in-business capital.

**Outlook:** In 2005, production at Tau Lekoa is expected to rise to 311,000 ounces on improved recoveries. Total cash cost is anticipated to increase to \$377 per ounce. Capital expenditure is expected to be

A mid-shaft loading system, consisting of a single skip/cage combination with a hoisting capacity of 1,000 tonnes per day, is being used in the excavation of infrastructure and the access development on the first two levels. The spacing between these levels is 300 metres so as to reduce the distance of the access development to the reef blocks, which are 2,500 metres away. The development of the infrastructure on the lower three levels is under way.

Stoping is based on a sequential grid system with 5-metre dip crush pillars between the raise lines. The raise lines are spaced 200 metres apart on the dip of the reef, with 30-metre long panels. Backfill is carried to within 4 metres of the advancing stope faces and 75% of the total area extracted is likely to be backfilled.

Planned optimal production level ranges between 14,000 – 16,500 m<sup>2</sup> per month on 66 panels over six mining levels, yielding some 95,000 reef tpm. Development will peak at 2,500 metres per month, of which 380 metres will be developed on reef.

**Performance in 2004:** Moab Khotsong produced 9,000 ounces of gold. Commercial production is scheduled for 2006. Capital expenditure for the year amounted to \$80 million (R513 million), 21% more than in 2003.

**Growth prospects:** Moab Khotsong, is the largest of South Africa's current projects. Located in the Vaal River area, the project involves sinking, constructing and equipping the shaft systems to a depth of 3,130 metres below surface, providing access tunnels to the reef horizon on 85, 95 and 101 levels, and developing the necessary ore reserves.

The project is expected to produce 4.9 million ounces of gold from 9.70 million tonnes of milled ore over 12 years. The project capital cost is estimated at \$651 million (at end 2004 exchange rate), of which \$585 million has been spent to date. The main shaft extension has been completed following the shaft's commissioning in March 2003. Access development is progressing to plan. The first raise-line has been

established and stoping operations began in January 2004. Moab Khotsong is forecast to reach commercial production in 2006.

**Outlook:** Development of the Moab Khotsong mine will continue with capital expenditure of \$79 million planned for the year.

## Mineral resources and ore reserves

Mineral resources and ore reserves are reported in accordance with the Australasian Code for Reporting of Mineral Resources and Ore Reserves (the JORC Code), together with the South African Code for the Reporting of Mineral Resources and Mineral Reserves (the SAMREC Code). Mineral resources include the ore reserve component.

As at 31 December 2004, AngloGold Ashanti had total mineral resources of 218.2Moz and ore reserves of 78.9Moz. Of these, the Vaal River region accounted for mineral resources of 61.6Moz and ore reserves of 26.3Moz (the respective numbers for the South Africa region as a whole are 117.0Moz and 39.1Moz).

		Metric			Imperial		
		Tonnes million	Grade g/t	Contained gold tonnes	Tons million	Grade oz/t	Contained gold million oz
<b>Mineral resources (as at 31 December 2004)</b>							
Great Noligwa	Measured	9.5	17.80	169.6	10.5	0.519	5.5
	Indicated	17.2	14.70	252.3	18.9	0.429	8.1
	Inferred	3.4	11.72	39.7	3.7	0.342	1.3
	<b>Total</b>	<b>30.1</b>	<b>15.35</b>	<b>461.7</b>	<b>33.2</b>	<b>0.448</b>	<b>14.8</b>
Kopanang	Measured	2.7	16.95	46.3	3.0	0.494	1.5
	Indicated	19.9	17.26	343.5	21.9	0.503	11.0
	Inferred	1.7	18.30	30.3	1.8	0.534	1.0
	<b>Total</b>	<b>24.3</b>	<b>17.30</b>	<b>420.1</b>	<b>26.8</b>	<b>0.504</b>	<b>13.5</b>
Moab Khotsong	Measured	0.1	12.52	1.6	0.1	0.365	0.1
	Indicated	18.4	22.75	417.6	20.2	0.664	13.4
	Inferred	6.3	18.63	117.1	6.9	0.543	3.8
	<b>Total</b>	<b>24.8</b>	<b>21.65</b>	<b>536.3</b>	<b>27.3</b>	<b>0.631</b>	<b>17.2</b>
Tau Lekoa	Measured	6.7	6.01	40.3	7.4	0.175	1.3
	Indicated	46.1	5.23	240.8	50.8	0.152	7.7
	Inferred	9.6	7.21	69.5	10.6	0.210	2.2
	<b>Total</b>	<b>62.4</b>	<b>5.62</b>	<b>350.7</b>	<b>68.8</b>	<b>0.164</b>	<b>11.3</b>
Vaal River Surface (VRGO)	Measured	0.0	0.00	0.0	0.0	0.000	0.0
	Indicated	231	0.36	82.9	254.6	0.010	2.7
	Inferred	101.3	0.66	66.4	111.6	0.019	2.1
	<b>Total</b>	<b>332.2</b>	<b>0.45</b>	<b>149.3</b>	<b>366.2</b>	<b>0.013</b>	<b>4.8</b>
<b>Ore reserves (as at 31 December 2004)</b>							
Great Noligwa	Proved	9.0	8.39	75.2	9.9	0.245	2.4
	Probable	10.8	8.97	97.3	12.0	0.262	3.1
	<b>Total</b>	<b>19.8</b>	<b>8.71</b>	<b>172.5</b>	<b>21.8</b>	<b>0.254</b>	<b>5.5</b>
Kopanang	Proved	2.9	7.27	21.0	3.2	0.212	0.7
	Probable	22.9	7.21	165.6	25.3	0.210	5.3
	<b>Total</b>	<b>25.8</b>	<b>7.22</b>	<b>186.5</b>	<b>28.5</b>	<b>0.211</b>	<b>6.0</b>
Moab Khotsong	Proved	0.1	6.80	0.6	0.1	0.198	0.0
	Probable	19.8	14.13	280.1	21.9	0.412	9.0
	<b>Total</b>	<b>19.9</b>	<b>14.09</b>	<b>280.7</b>	<b>22.0</b>	<b>0.411</b>	<b>9.0</b>
Tau Lekoa	Proved	5.2	4.40	23.0	5.8	0.128	0.7
	Probable	17.6	3.86	67.9	19.4	0.112	2.2
	<b>Total</b>	<b>22.8</b>	<b>3.98</b>	<b>90.9</b>	<b>25.2</b>	<b>0.116</b>	<b>2.9</b>
Vaal River Surface (VRGO)	Proved	5.6	0.61	3.4	6.1	0.018	0.1
	Probable	148.3	0.58	85.6	163.5	0.017	2.8
	<b>Total</b>	<b>153.9</b>	<b>0.58</b>	<b>89.0</b>	<b>169.6</b>	<b>0.017</b>	<b>2.9</b>

## 6 | Economic performance

**Government remittances:** AngloGold Ashanti's operations in South Africa paid an amount of US\$6 million (R39 million) in corporate taxes in the 2004 financial year.

### Meeting the Mining Charter's procurement targets

With R711 million (\$111 million) of total procurement spend at its South African operations in 2004 being attributable to companies with at least 25% ownership by historically disadvantaged South Africans (HDSA), AngloGold Ashanti has been able to raise its own HDSA procurement targets in line with its commitment to the spirit of the Broad-Based Socio-Economic Charter for the Mining Industry (the Mining Charter) and the accompanying Scorecard. Though the Mining Charter and Scorecard do not set specific targets, a key aspect is procurement and

HDSA-affiliated companies. The intention is to encourage and promote

growth and employment by businesses managed and owned by HDSAs. AngloGold Ashanti's black economic empowerment (BEE) procurement policy is designed to comply with the principles set out in the Mining Charter.

In 2001, the then AngloGold introduced its black economic procurement strategy which serves as a guide for the purchase of goods and services from BEE companies. At that time, total BEE procurement was 7.5% of total procurement of R3.4 billion (\$530 billion). Since then, this has increased steadily towards the target of 63.5% for 2012.



## Community

- R23.6 million (US\$3.8 million) was spent on social investment initiatives by the South Africa region in 2004. These funds were distributed largely through the AngloGold Ashanti Fund with the balance being dispensed by corporate office and the operations
- The individual operations support and encourage local economic development and the development of small business in particular.
- The Mineral and Petroleum Resources Development Act (MPRDA) which came into effect in South Africa in May 2004, requires that all mining operations apply for conversion of so-called old order mining rights into new order mining rights. This includes the submission of social and labour plans in addition to mining works plans and environmental management plans.

### Social investment spending in South Africa (\$ 000)

South Africa	3,808
Corporate office	1,143
AngloGold Ashanti Fund	2,519
Operational expenditure	146



### Making a difference – the AngloGold Ashanti Fund and Trust

The AngloGold Ashanti Fund is the primary vehicle for the group's social initiatives in southern Africa. During 2004, the Fund distributed R16.148 million (\$2.59 million) to a wide range of projects across the region - primarily in those areas where the company operates and in the regions from which it draws its employees and where many employees families reside. The Fund's primary areas of activity are:

- education
- welfare and development
- health care
- HIV/AIDS
- skills training and job creation

The AngloGold Ashanti Fund is managed by Tshikululu Social Investments and aims to provide constructive support for sustainable projects which contribute to the region's longer-term well-being and development.

An important change for the Fund in the past year has been the increasing emphasis placed on the local area committees. These comprise operational personnel who are in close contact with the regions and communities in which they operate and are able to better advise on local needs. It is hoped that the role of the local area committees will grow and bring the fund closer to the communities and people to whom it contributes. In addition, in South Africa, relationships with local authorities have been strengthened by the appointment of a Corporate Social Responsibility (CSR) manager, Butiki Loliwe. He works with a small team whose duties include ensuring a closer alignment between the fund's activities and the local authorities' Integrated Development Plans.

## Lesotho water project – bringing a much needed resource to employees' families



TEBA, formerly the mining industry's recruitment agent, has been engaged in the development and maintenance of village water supplies in Lesotho since 2001, working in close co-operation with the Lesotho Department of Rural Water Supply (RWS). Lesotho is a major labour-sending area, with 60,000 mineworkers, including contractors working on South African mines. The work of the RWS has been restricted by limited funding and by challenges in the supporting water distribution network to support the dam building project put in place.

Research undertaken by AngloGold Ashanti in 1998 showed that communities in southern Lesotho regarded the supply of water as their

main priority. This project, based in the Mafeteng District of Lesotho, involves repairing and refurbishing 180 boreholes and hand pumps across at least 50 villages. Most of the pumps in the villages are in extremely bad condition having been neglected and vandalised. On average about 40 households use one water pump and with the average number of people per household estimated at six people, about 240 people benefit from each pump.

The first phase of the project began in 2003 and costs about R65,000 per month, of which AngloGold Ashanti provides R50,000.

## HIV/AIDS

HIV/AIDS is a significant challenge in South Africa, and given the labour-intensive nature of mining in this country, this pandemic is critical. Employees at the South Africa operations account for 69% of the group's workforce. Based on best available information, AngloGold Ashanti estimates an HIV-prevalence rate in 2004 of 30.24% (2003: 29.95%) among its South African workforce.

### HIV/AIDS policy and agreement

AngloGold Ashanti's HIV/AIDS policy is contained in an agreement signed with all recognised trade unions in July 2002. Embodied within this agreement are the principles of:

- non-discrimination
- confidentiality and non-disclosure
- benefits applicable, and
- rules governing ill-health retirement.

While the provision of anti-retroviral therapy (ART) was not part of the original agreement, trade unions have participated in the ART programme from inception through the project's steering committee and ethics forum. Efforts have been made to engage with the primary union, the National Union of Mineworkers (NUM) to undertake an HIV-prevalence survey amongst employees, linked to a behavioural study. This information would be used to plan for and implement appropriate changes to the current programme.

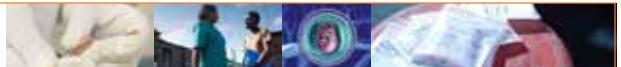
No progress has been made in this regard as the company has been unable to convince the NUM that this will be to the benefit of the company and employees alike.

### Governance and structure

AngloGold Ashanti's HIV/AIDS programme is managed at both a clinical and operational level, and overseen by a joint management/union committee. The clinical expertise, resources and oversight are provided by AngloGold Health Service (AHS). AHS provides a comprehensive medical service at on-mine clinics, occupational health centres, and two world-class hospitals. These services are complemented by the research undertaken by Aurum Health, a subsidiary of AHS. Included as part of the AHS service is the company's voluntary counselling and testing (VCT) and wellness programme which includes the provision of ART. Since the health care service is managed independently of the mining operations, this promotes the confidentiality of the medical programme. In addition to centralised education, training and management initiatives undertaken under the auspices of AHS, each operation has a joint management/union HIV/AIDS committee that oversees the implementation of mine-based programmes, and raises any issues of concern.

The AngloGold Ashanti HIV/AIDS programme comprises five parts: education and training; voluntary counselling and testing (VCT); a wellness programme (including ART); ill-health retirement for employees who become AIDS-ill; and home-based and community-based programmes.

## AIDS prevalence levels



An anonymous unlinked survey undertaken in 1999 indicated an HIV prevalence level among employees of 24%. This was followed up by a second survey in 2000/2001, undertaken in collaboration with the London School of Hygiene and Tropical Medicine which indicated a prevalence level of 29%. Based on these surveys, provincial antenatal data and extrapolations from comparable reference groups, AngloGold Ashanti's current best estimate of prevalence

levels among employees is 30.24%. Using actuarial modelling, the company is able to project prevalence levels going forward. In terms of this model, prevalence levels are thought to have peaked in 2004. However, without a scientifically-based survey, these numbers cannot be confirmed. Based on the current stance of the NUM on anonymous testing, such a survey is unlikely to be conducted within the foreseeable future.

## 8 | Safety and health

In 2004, the LTIFR data per million man hours worked for the Vaal River operations were as follows:

Great Noligwa	9.83
Kopanang	14.08
Tau Lekoa	25.96
Moab Khotsong	7.11

In particular:

- The shaft mine overseer section at Tau Lekoa mine achieved one million fatality-free shifts on 21 June 2004. It took the section, comprising about 250 people, 12 years and 10 months of safe operations to reach this milestone.
- On 31 March 2004, after 5.5 months, Great Noligwa reached one million fatality-free shifts.
- On 10 July 2004, the Kopanang mine achieved one million fatality-free shifts. It took 4,900 employees 8.5 months to attain this.
- The South Africa operations re-launched the safety programme on 7 April 2004. This followed a Safety Summit held in March. (See box)

### Five strategic thrusts underpin South African safety drive

The South Africa region's 2004 Safety Summit resolved to follow five key strategic thrusts for safety management during 2004/2005. These are:

- mindset change;
- risk management;
- fall of ground management;
- horizontal and vertical transport; and
- wellness in the workplace.

### Temporary shift in hearing loss study at Great Noligwa

Many miners are exposed to one of the most insidious work-related diseases in the industry – noise-induced hearing loss (NIHL). AngloGold Ashanti's approach to the challenge of NIHL is to firstly address the problem at source by muffling rockdrills, fans and other noisy underground equipment, and secondly to ensure that appropriate hearing protection devices are worn by those employees who are still exposed to excessive noise levels. Audiologists monitoring hearing at AngloGold Ashanti's Vaal River operations have recently embarked on research which they hope will provide some solution to early intervention, which, coupled with individual responsibility, should lead to more successful hearing conservation programmes. Instead of testing in an audio booth at the Occupational Health Centre where employees would only visit once or twice a year, they decided to test a sample group are to be closer to the workplace, and audio booth are to be set up at the point where miners exit the mine after work.

AngloGold Ashanti is committed to its long-term objective of eliminating accidents. Regrettably, 31 employees lost their lives in work-related accidents at the South Africa operations, of these 9 were from the Vaal River operations (5 at Great Noligwa, 2 at Tao Lekoa, 1 at Kopanang and 1 at Moab Khotsong). The primary cause of accidents is falls of ground (67%).

At the South Africa operations, comprehensive health care services are provided by AngloGold Health Service. Medical surveillance is conducted in line with the Mine Health and Safety Act: 51,084 occupational medical surveillance examinations (initial, periodical, transfer and exit) were performed in 2004.

In South Africa, noise-induced hearing loss (NIHL), occupational lung diseases (OLD) and tuberculosis (TB) are categorised as occupational diseases and are therefore compensable by law. In 2004:

- 285 new cases of NIHL were compensated during 2004, which is a rate of 7 per 1,000 employees. This is a decrease of 61% on the previous year's rate of 18 per 1,000 employees.
- 319 cases of OLD were compensable in the South Africa region during 2004, which is a rate of 8 per 1,000 employees.
- 1,386 new cases of TB were detected and treated during the year, which is a rate of 35 per 1,000 employees. Despite intensive efforts to both detect and treat TB, prevalence rates are increasing as a result of the increasing incidence of HIV and AIDS among a silica-exposed workforce.

Aurum Health Research, a wholly-owned subsidiary of AngloGold Health Service (AHS) has been granted \$14 million for a major HIV-TB research project over five years. The grant is part of a larger award to the international Consortium to Respond Effectively to the AIDS/TB Epidemic (CREATE) to research strategies for TB control, by the Bill and Melinda Gates Foundation.

### Control of mining-induced seismicity in the South Africa region

Seismic events and rockbursts are a constant feature of South African gold mines and a significant cause of fatalities. AngloGold Ashanti has adopted a holistic approach to the management of seismicity at its deep-level mining operations in South Africa.

The type of seismicity experienced in an area or particular mine is closely related to the geological setting. The Klerksdorp area, where the Vaal River mines are situated, is geologically more complex than the West Wits area and most of the seismic events here relate to the failure of geological structures and some strainbursting. The area experiences some very large seismic events related to failure along major geological structures. These are normally some distance away from workings. AngloGold Ashanti's fall-of-ground management (FOGM) system was developed in 2002 and has been implemented at all its South African deep level mines to manage mining-induced seismicity and rockbursts.

## Controlling dust levels underground remains a focus area



Silica dust in the air, generally as particles too small to be visible to the naked eye, is an inevitable accompaniment to South African gold mining. The inhalation of silica dust may cause silicosis, an occupational lung disease (OLD).

In 2003, AngloGold Ashanti's South Africa region established a 'wellness in the workplace forum' – a multi-disciplinary body comprising experts from the areas of dust control, noise in the workplace, radiation, TB and HIV/AIDS. The forum has taken over the work of the regional dust steering committee. Similar forums will be established at an operational

level during 2005 to ensure that this integrated approach to occupational health is cascaded through the company. Kobus Dekker, (occupational environment, safety and health manager – occupational hygiene) is responsible for dust and noise control. Dust management involves both the implementation of dust control systems and the education and training of employees to implement these. Results are encouraging. Between 2002 and 2004, the percentage of employees at the South African operations exposed to levels of total respirable dust in excess of 1.00 mg/m<sup>3</sup> has decreased from 2.4% in 2002 to zero for the second and third quarters of 2004.

## Labour

In 2004, 19,538 people were employed at the Vaal River operations, a decline of 5.7% on 2003. Approximately 93% of all employees are either represented by unions or catered for by the agency shop agreement.

The four recognised unions are the National Union of Mineworkers (NUM), the United Association of South Africa (Uasa), Mineworkers Solidarity and the South African Equity Workers' Association (SAEWA), representing respectively 72.2%, 11%, 2.6% and 0.8% of employees in the region.

**Employment equity:** This forms a part of AngloGold Ashanti's broader human resources strategy to promote an organisational culture that recognises the diversity of the societies within which the company conducts its business, and which affords all employees the development opportunities that will enable them to achieve their optimal levels of career development in the course of their employment with the company. Key elements of the group's employment equity programme include employee development and retention, the implementation of strategies to counteract losses, to develop careers and to promote mobility in an environment that is free of discrimination.

In South Africa, the employment of historically disadvantaged South Africans (HDSAs) is a particular priority. Employment targets and achievements are reported annually to the South African Department of Labour. Within South Africa, 32% of management comprises HDSAs. The Employment Equity Act and Broad-based Socio-economic Empowerment Charter (the Mining Charter) both cater for the promotion of HDSAs. An employment equity and skills development committee was launched at corporate office in 2004 to identify and promote employment equity and diversity, and to monitor compliance with statutes and regulations. The South Africa region has developed policies regarding equal opportunity employment, a framework promoting opportunities for women in mining, sexual harassment, and fair practices for appointments and promotions.

Foreign migrancy is reported in line with the Mining Charter. Foreign migrants are defined as employees drawn from outside of the borders of the country. Many other migrant workers originate from rural areas within South Africa. The percentage of foreign migrant employees was 37% as at 31 December 2004.

**Training and development:** In South Africa, where 69.4% of the group's employees are based, the company is registered with the Mining and Minerals Sector Education and Training Authority (SETA) known as the Mining Qualifications Authority (MQA), a tripartite body formed between labour, the state and employers. The South Africa region's centralised training venue provides accredited technical training in the following core disciplines: mining, mining services, engineering, metallurgy, and occupational environment safety and health. The centre is ISO 9002 certificated and accredited by the MQA. Skills programmes and learnerships presented at the centre are outcomes-based and provide employees with the necessary knowledge and skills to do their work safely and efficiently.

**Adult basic education and training (ABET):** Achieving 100% employee literacy and numeracy has long been a target for AngloGold Ashanti. More recently, the South African Mining Charter requires that all employees are offered the opportunity to become functionally literate and numerate within five years of conversion to new order mining rights.

During the past 12 years, some 32,000 employees have attended ABET in South Africa: 76% of all supervisory employees (some 10,060 employees) have an ABET qualification; 45% of all employees have an ABET level 3 and above qualification. ABET has three qualification levels, 1, 2 and 3. ABET 1 is equivalent to three years of formal education, ABET 2 to five years and ABET 3 to seven years. As from 2004, the equivalent of ABET 4 – NQF1 – is available to employees.

Full-time and part-time ABET courses are held at individual mines at Vaal River and West Wits.

**Graduate training:** The South Africa Region spent \$1.79 million (R11.5 million) on bursaries for 112 students at various institutions. Currently, students are pursuing tertiary studies in:

- mining: 34 students;
- engineering (mechanical, heavy current electrical, as well as process and instrumentation control): 36 students;
- metallurgy: 17 students; and
- mineral resource management (geology and survey): 25 students.

## Implementing fall of ground regulations

Falls of ground remain one of the most significant causes of fatal accidents in the South African underground mining industry. In an effort to combat this, the Department of Minerals and Energy (DME) formulated new Fall of Ground Regulations, in accordance with the provisions of Chapter 14 of the Mine Health and Safety Act, in July 2002. These came into effect in January 2003.

Two groups are affected by these regulations: people who are required to declare a working place safe ('Competent Person A'), and those who are required to install, maintain or remove any support unit ('Competent Person B'). These groups need to be assessed and found competent in accordance with education and training standards and qualifications as generated by the Mining Qualifications Authority (MQA). The MQA determined the specific competencies required to perform these activities and grouped the associated unit standards into clusters. These clusters of unit standards were registered as skills programmes.

As this was one of the first sets of regulations to place the responsibility on employers to determine the competence of employees, the MQA decided to select four lead sites to pilot the implementation process. AngloGold Ashanti was selected as a gold mining lead site. The assessment and implementation process was carried out simultaneously at AngloGold Ashanti's South Africa region's business units, so that any problems encountered could be timeously communicated to the MQA.

## Towards the transformation of proto teams

In any mine accident in South Africa, important behind-the-scenes players are the personnel of the Mines Rescue Services (MRS), commonly known in the industry as proto teams. Started 80 years ago to provide resources and expertise for an effective emergency service in the mining sector, MRS is a private sector, non-profit organisation that trains volunteer brigadesmen who work in the industry to find and recover fellow employees in the event of an underground accident or incident.

Before the democratic election in 1994, the proto teams consisted of whites only. Although there was no legislation excluding people of colour, brigadesmen were usually drawn from within the supervisory ranks from which – historically – men of colour and women were excluded. The transformation of the mine's proto teams, in line with the management structure of the company, has become an important priority for AngloGold Ashanti.



## Environment

All the South African operations have approved environmental management programmes (EMPs) in place and, in line with this, applications for conversion to new order mining rights in line with the MPRDA have been submitted to the Department of Minerals and Energy (DME). An internal audit of the South African operations has indicated that the region is largely compliant with its EMP obligations.

A total of 72 environmental audits were conducted at the South Africa operations in 2003 – most legal non-compliance issues were associated with water management and waste management. Attention during 2004 focused on addressing the findings of these audits. A new auditing protocol to evaluate legal compliance has been developed and will be introduced in 2005.

Cyanide protocol – the international Cyanide Code has been adopted as the standard for cyanide management within AngloGold Ashanti. An internal audit of compliance was completed at the South African operations in 2004.

South African law requires that AngloGold Ashanti calculate its estimated environmental closure and final rehabilitation costs for operations which are subject to the requirements of the law. The law also requires that this estimate be used by AngloGold Ashanti to make periodic cash contributions to an environmental trust fund. In 2004, the

Vaal River operations contributed \$6.06 million (R37.57 million) to such a fund, bringing the balance at the end of the year to \$33.33 million (R206.65 million).

**Energy usage:** Energy is a major cost driver, particularly in underground mining. In its efforts to conserve energy, the group is focusing on ensuring the efficient use of energy and on developing and implementing renewable energy sources. During 2004, AngloGold Ashanti together with Anglo American plc completed a technology strategy in respect of the energy platform which has as its objective the reduction of the group's energy intensity year-on-year.

**Pollution prevention:** The prevention of pollution, particularly of the air and water resources is generally also considered in the operational EMS. Action plans are being put into place to address the 16 identified near-surface polluted aquifers. The Department of Water Affairs and Forestry has recommended that companies involved in mining areas, such as Klerksdorp and Carletonville, collectively design a water management closure plan for the region, in addition to the normal mine closure plans. Water management agreements will be negotiated with the relevant mining parties in the two operational areas to address potentially elevated constituent concentrations in ground water. Budgetary constraints in recent years have hampered environmental remediation efforts in the



### Three-year project to fast track environmental management plans in South Africa

The environmental management department attached to the South African operations has been tasked with fast tracking some of the major environmental remediation initiatives identified by the group over the next three years. Says project manager, Tony Da Cruz, "When pressures mount to reduce the funding requirements, particularly during periods in which the margins are being squeezed, inevitably the environmental components of the operational budget are cut because they are deemed non-essential to production. The role of the Environmental Management Department is to ensure that the appropriate levels of resources are applied to meet the environmental commitments of the South Africa region in a timely manner and to ensure legal compliance at all times."

South Africa region. In an effort to remedy this, some R19 million (\$2.96 million) has been spent on the so-called 'legacy projects' in 2004 and an additional R9 million (\$1.40 million) is budgeted for 2005.

**Hydro-power:** At the South African operations, for example, hydro-power is used to generate sufficient energy for rockdrills and other equipment at the Tau Lekoa mine in the Vaal River region. This is one of the few gold mines in the country to operate on this system, which also has a number of occupational health advantages (such as reduced noise and dust levels). Other applications include the powering of pumps at a number of other mines in the area. The Moab Khotsong mine in the Vaal River area is participating in the National Electricity Regulator's demand-side management programme, with significant cost savings expected.



### Energy conservation gains renewed impetus in the South Africa region

In its drive to conserve energy – primarily from a cost and environmental perspective – the South Africa region's engineering department has focused on two areas: developing and implementing renewable energy sources on the one hand and ensuring efficient use of energy on the other. Renewable energy relies on natural resources such as the sun, the wind, water, the earth's heat, and plants. Renewable energy technologies turn these fuels into usable forms of energy – most often electricity.

Says Keith Arnold, energy engineer, "The South African operations make use of the depth (up to 3,800 metres) at which we operate to generate power from the water used for our mining process. Water is already gravitated underground for cooling the working areas, for dust suppression and used in some underground equipment."

At the Kopanang mine, in the Vaal River area, the Pelton Wheel

turbines are coupled to pumps. The pumps are then used to transport 'hot' used water to surface for re-cooling through the surface refrigeration plant for re-use underground as a cooling medium. Tau Lekoa mine, also in the Vaal River area, uses its depth to drive hydro-powered drills and other equipment in the stopes. Tau Lekoa is the only gold mine in the country to be powered largely by water. Moab Khotsong will implement a demand side management project in late 2005/early 2006 whereby water supply down the mine will be used to displace the water coming out of the mine through a three-chamber pipe feeder system. The only power required will be to overcome the friction losses in the system. Studies are being undertaken to indicate expected savings, but previous figures suggested that 32 MW of pumping would be replaced by only 10 MW using the chamber pipe feeder system. Four systems will come into operation and each system will have the capacity to displace 318 litres per second.

## New legislation to impact on air quality management

Air quality management, which is currently governed by the Atmospheric Pollution Prevention Act of 1965, is to fall under the new Air Quality Bill, when it is promulgated in 2005.

Kobus Dekker – occupational, environmental, safety and health manager of AngloGold Ashanti's South African region – describes air quality management at the company as the elimination or control of “all pollutants generated from the metallurgical plants (the main potential source of pollutants), tailings storage facilities and ore piles, as well as any other sources, for example, refrigeration plants, vehicles and ventilation fans”. The Bill's priority areas are specifically the ambient concentration of ozone, nitrogen oxide (NO), oxides of nitrogen (NOx), sulphur dioxide (SO<sub>2</sub>), carbon monoxide (CO), lead, and amount and size of particulate matter (PM10) and total suspended solids (TSS).

Major concerns arising from the assessment are dust levels, which pose a potential health risk to fauna, flora and humans; and SO<sub>2</sub> emissions from the metallurgical acid plant stacks. In 2004 AngloGold Ashanti focused on monitoring and reducing dust levels and has purchased two weather stations which measure temperature, rainfall, wind speed and direction; dust fall-out buckets for monthly monitoring at West Wits and Vaal River; and two PM10 dust monitors to monitor human inhalation (particles smaller than 10 microns are known to pose a health risk). In 2005, the focus is on the monitoring and reduction of SO<sub>2</sub> and sulphur trioxide (SO<sub>3</sub>) emissions. Once approved by management, AngloGold Ashanti's Air Quality Management Plan will be forwarded to each of the South African operations for incorporation into their mine-specific Environmental Management Implementation Plan.

## Dust management at Vaal River – response to local community concerns

The West Extension Tailings Storage Facility (TSF) was commissioned in 1985 as one of the repositories for tailings from AngloGold Ashanti's Vaal River operations, with approximately 22 million tonnes of tailings having been deposited here to date. The TSF is currently 32 metres in height, and is expected to increase to 60 metres over its remaining lifespan of 12 years. During the dry season (August and September) strong winds can transport fine sandy material from the outer walls and beaches on the side walls of the TSF into the surrounding environment resulting in high dust depositions. This was the subject of community concern and debate in late 2003, and which has been addressed by AngloGold Ashanti in 2004.

Public complaints about TSFs in the area were made in 2002 to the manager of tailings and land at AngloGold Ashanti's Vaal River

operations and specifically about the West Extension TSF. AngloGold Ashanti responded by installing a large water tank to spray down the driving surfaces on the TSF. Despite this, complaints from the public continued.

In addition, in 2004, a dust monitoring programme was established to monitor public exposure to tailings dust. Apart from addressing public concerns, one of the main aims of the project is to measure compliance with future legislation on Air Quality, which will set new dust exposure limits for the public.

Since implementation, no further complaints have been received from the public regarding dust emissions. This issue will, however, require ongoing vigilance over the operational life of these TSFs.

## Woodlands project – good progress being made

Good progress is being made with the Mine Woodlands and Sustainable Vegetation of Slimes Dam projects being overseen by the University of the Witwatersrand, Johannesburg (Wits) and AngloGold Ashanti South Africa. This research programme, for which the initial work began in 1996, combines ecological engineering with a phytoremediation approach to reduce environmental impact and liability. AngloGold Ashanti has championed this programme since its inception, and between 1996 and 2005, contributed a total of R9.1 million (\$1.42 million) for slimes dam slope reduction, the planting of trials, infrastructure and R&D.

The mining industry's approach to reducing erosion and dust from tailings dams has largely involved the planting and irrigation of pasture grasses. Pasture grassing is expensive and consumes up to three times annual rainfall for irrigation; it prevents surface erosion (i.e. dust control) for less than 10 years, is rarely effective in containing erosion in the longer term, and does not prevent seepage and water pollution, or achieve ecological sustainability. As pasture-grassing has proven unsustainable for mine closure purposes, there is a need to determine what type of vegetation would prevent pollution emissions from tailings dams, and so lead to rehabilitation.

Trees and shrubs have several advantages over grasses for the purposes of pollution control. Many trees are evergreen, in contrast to grasses which are dormant in winter. The more extensive root systems of trees can therefore abstract seepage all year-round, and from greater depths. The fine root and leaf litter of trees is more effective than that of grasses in fostering the formation of top soil, and fine roots can also take-up or immobilise some pollutants. Woodlands can remove organics, nitrates, phosphates, sulphates, various heavy metals and radionuclides from soil and groundwater, and internationally, phytoremediation is gaining acceptance as the technology of choice for landfills, mining waste and contaminated land.

Given the improved state of environmental knowledge, and the changes in legislative emphasis, there is now potential for significant long-term liability on the part of land owners and users. The AngloGold Ashanti-Wits programme is pioneering methods to prevent pollution, remediate polluted soils and water, and convert tailings dams to safe and sustainable land uses.