



report to
society 2003



occupational safety and health



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Levels of assurance

The **RA** symbol indicates reasonable assurance, established by:

- conducting interviews and holding discussions with management, key personnel and/or stakeholders of AngloGold Limited and assessing data trends.
- obtaining an understanding of the systems used to generate, aggregate and report the selected data.
- conducting site visits to test systems and data and inspecting premises where necessary.
- assessing the completeness and accuracy of the selected data.
- reviewing and analysing collected information and effecting re-calculations where considered appropriate.

The **LA** symbol indicates limited assurance, established by:

- conducting interviews and holding discussions with management, key personnel and/or stakeholders of AngloGold Limited and assessing data trends.
- reviewing systems and documentation and performing analytical procedures where necessary.



AngloGold as an employer – safety and health

- The company is committed to **complying** with all relevant occupational safety and health laws, regulations and standards. In the absence of such standards, leading practice will be adopted.
- We are committed to providing a working environment that is conducive to **safety and health**.
- The management of occupational safety and health is a prime **responsibility** of line management, from the executive level to the first line supervisory level.
- We strive for **employee involvement** and consultation with employees or their representatives to gain commitment in the implementation of these principles.
- The company is committed to providing all necessary **resources** to enable compliance with these principles.
- The company will not tolerate or condone deliberate **breaches** in standards and procedures.
- We will implement safety and health management systems based on internationally recognised **standards** and we will assess the effectiveness of these systems through periodic audits.
- We will conduct the necessary **risk assessments** to anticipate, minimise and control occupational hazards.
- We will promote initiatives to continuously **reduce** the safety and health **risks** associated with our business activities.
- We will set safety and health objectives based on comprehensive strategic **plans** and will **measure** performance against these plans.
- We will **monitor** the effects of the company's operational activities on the safety and health of our employees and others, and we will conduct regular performance reviews.
- We will provide all necessary personal **protective equipment**.
- We will establish and maintain a system of **medical surveillance** for our employees.
- We will **communicate** openly on safety and health issues with employees and other stakeholders.
- We will ensure that employees at all levels receive appropriate **training** and are competent to carry out their duties and responsibilities. We will require our **contractors** to **comply** with these principles and we will seek to influence joint partners to apply them as well.



1. Key indicators ^{RA}

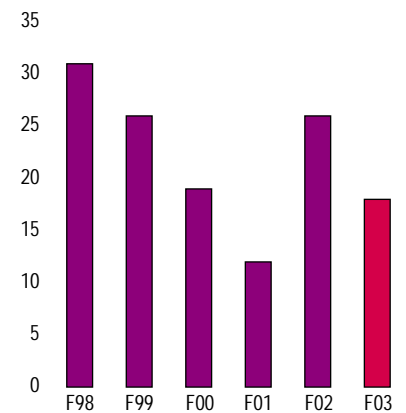
- 49,208 occupational medical surveillance examinations (initial, periodical, transfer and exit) were performed during 2003 in South Africa. These are conducted in accordance with the requirements of the Mine Health and Safety Act. Medical surveillance is also undertaken at the East and West African, Australian and North and South American operations in line with specific needs and local legislation.
- 774 new cases of noise-induced hearing loss (NIHL) were reported on the South African operations during the year. This is a rate of 18 per 1,000 employees, compared with 26 per 1,000 employees in 2002.
- 167 cases of occupational lung disease (OLD) were reported at the South African operations during 2003. This represents a rate of four per 1,000 employees, the same as reported the previous year.
- 992 new cases of tuberculosis (TB) were treated during the year at the South African operations, a rate of 23 per 1,000 employees. This is unchanged from the previous year. The relatively high rates of TB infection are a consequence of a high prevalence of HIV.

2. Milestones – 2003 ^{LA}

- Baseline tests for NIHL were performed on all South African employees exposed to noise by the end of November 2003, in accordance with new hearing compensation legislation that was enacted in July 2002.
- Ongoing success in dust suppression programmes: dust suppression measures show results. ([See case study on page SH33](#)).
- All machine drills and 95% of noisy fans were silenced on South African operations as part of an extensive hearing conservation programme.
- AngloGold Health Service (AHS) now manages or oversees health facilities at all operations in the East and West Africa region.

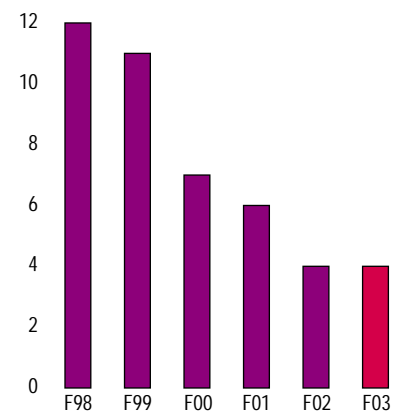


NIHL new cases – SA region only
Rate per 1,000 employees

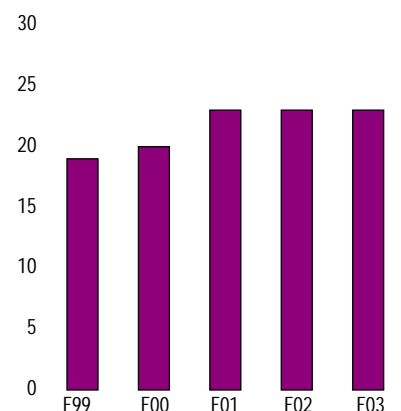


Note: The recent increases in NIHL compensation levels is related to the intensive efforts to identify individuals with impairment, as a baseline has now been established on all exposed employees in line with new legislation.

OLD new cases – SA region only
Rate per 1,000 employees



New TB cases – SA region only
Rate per 1,000 employees



3. Safety and health policy and agreements

The group-wide safety and health policy implemented in 1999 was revised and re-ratified by the Board in April 2003, and re-issued to all operations. In addition, some regions and operations may have additional policies to which they adhere, as well as region specific legislation.

Safety and health policy

AngloGold, a South African-based international gold mining company, recognises that excellence in the management of safety and health is an integral part of its business. The AngloGold safety and health policy provides the foundation for the company's commitment to improving safety and health performance.

The Chief Operating Officer (COO) is charged with the overall management of occupational safety and health, reporting to the Chief Executive Officer (CEO) and also to a committee of the Board of Directors, which is under the chairmanship of a non-executive director. The Board requires company-wide compliance with this policy and this will be monitored by regular audit reports to the Board and sub-committee.

To achieve this AngloGold will:

- *provide a working environment that is conducive to safety and health;*
- *place the management of occupational safety and health as a prime responsibility of line management from the executive through to the first line supervisory level;*
- *obtain employee involvement and consult with employees or their representatives to gain commitment in the implementation of the policy;*
- *provide all necessary resources to enable compliance with this policy;*
- *comply with all relevant laws, regulations and standards. In the absence of appropriate legislation, standards reflecting best practice will be adopted;*
- *adopt a zero tolerance approach to the implementation of standards and procedures;*
- *implement safety and health management systems based on internationally recognised standards and assess the effectiveness of these through periodic audit;*
- *conduct the necessary risk assessments to minimise and control occupational hazards;*
- *promote initiatives to continuously reduce the safety and health risks associated with the business activities;*
- *set safety and health objectives based on a comprehensive strategic plan and measure performance against the plan;*
- *monitor the effects on the company's operational activities on the safety and health of employees and others and conduct regular performance reviews;*
- *provide the necessary personal protective equipment;*
- *establish and maintain a system of medical surveillance for all employees;*
- *ensure that employees at all levels receive appropriate training and are competent to carry out their duties and responsibilities;*
- *require contractors to comply with this policy; and*
- *seek to influence joint partners to apply this policy and promote it in other ventures.*

A country-specific policy, where required by legislation, is available.

Across the regions and operations, various safety and health agreements have been negotiated and are in place. The safety and health agreement signed between the management of TauTona and the unions represented on the mine is attached as an example. ([See TauTona safety and health agreement](#)).

4. Review of 2003

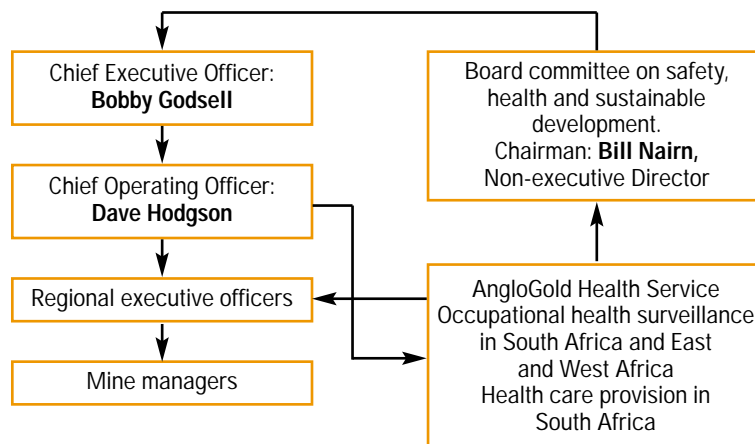
AngloGold recognises that excellence in the management of safety and health is integral to its success as a business entity. AngloGold is committed to working with employees, trade unions and government representatives to improve safety and health management across the company and has extensive joint management and union safety and health forums, particularly in South Africa, to be able to achieve this. Considerable resources and effort are dedicated to identifying and implementing best practice across operations, as well as addressing specific problem areas as and where these may arise.

Governance and structure

While a Board committee oversees safety and health reporting company-wide, the recently revised safety and health policy allows for country-specific principles and guidelines to be developed in accordance with local legislation. Guided by the policy, the COO, Dave Hodgson, is charged with the overall management of occupational safety and health. He reports to both the CEO, Bobby Godsell, and the Board committee on Safety, Health and Sustainable Development, which is chaired by non-executive Board member, Bill Nairn. The other committee members are Deputy Chairman, James Mottlatsi, and CEO, Bobby Godsell. Members of management are invited to participate in the committee's proceedings as and when required. In addition to reviewing the overall performance of the key indicators, the committee sets objectives and advises on strategy. The committee also conducts on-site inspections on matters of serious concern.

Although occupational health management is viewed as a matter for line management, occupational health surveillance and the provision of health care is overseen by AHS. ([See box](#)).

Management of safety and health



Occupational health issues remain important

AngloGold provides a comprehensive health service to its employees, especially in South Africa, where the majority of the company's employees are located.

In South Africa, AngloGold runs two occupational health centres, each of which is staffed by two doctors and some 30 support health care practitioners. These centres conduct risk-based medical surveillance programmes, of which 5,733 initial, 804 transfer, 38,528 periodical (annual/three yearly) and 4,143 exit medical examinations were undertaken during the year.



About AngloGold Health Service

AngloGold Health Service (AHS) is a wholly-owned subsidiary of AngloGold and provides health care services to AngloGold's 42,448 employees in South Africa and a growing number of their dependents through its extensive network of world-class hospitals, community-based clinics and on-mine medical stations. AHS also manages the provision of health care at the East and West African operations.

AHS employs some 1,300 people, 60% of whom are health care professionals. The company owns and operates two hospitals – one in Orkney and one in Carletonville. Each AHS hospital has medical, surgical and maternity wards, an intensive care unit, operating theatres, casualty and outpatient facilities, as well as radiography, physiotherapy and occupational health services. AngloGold's South African employees have unlimited access to these health care facilities.

AHS also operates two full-scale occupational health centres on behalf of AngloGold. At these centres initial periodical transfer and exit medical examinations are carried out in terms of legislation. The primary objective of this routine surveillance is the prevention, early detection and treatment of occupational lung diseases (OLD), it also ensures that employees are fit to work in their own specific occupation.

An AHS subsidiary, Aurum Health Research, was established in 1998 to conduct world-class research into HIV, TB and OLD. Staffed by senior medical and research personnel, Aurum is able to conduct fundamental research, the findings of which can be quickly and effectively implemented in the work situation.

Outside of South Africa, occupational health care is provided by on-site primary health care clinics.

The primary challenges facing the company from an occupational health perspective are:

- Noise-induced hearing loss (NIHL);
- Tuberculosis (TB); and
- Occupational lung disease (OLD).

NIHL levels improve

In South Africa, stricter screening for NIHL, in preparation for new compensation legislation which became effective in November 2003, required the base-lining of all employees. This meant an increase in NIHL reporting rates in 2002, but there was a significant decline in 2003.

Major efforts over the last three years have resulted in the muffling of all rock drills as well as 95% of all noisy underground fans in the South Africa region. Results from this initiative should become evident in decreased NIHL in the future as ambient noise levels have been significantly reduced.

In addition to engineering efforts, the hearing conservation programme was advanced by a trial to determine appropriate hearing protection devices (HPDs) for different occupations and workplaces. Five different HPDs are now standard stock items.

Controlling exposure to dust

Exposure to silica dust remains one of the major contributing factors in the development of TB and OLD. The relatively high rates of TB infection are also a consequence of the high background prevalence of HIV; 84% of new TB patients are HIV positive. ([See case study on page SH39](#)).

AngloGold continues to implement initiatives to improve dust control ([See case study on page SH33](#)) and eradicate or minimise the prevalence of OLD, in particular, silicosis ([See case study on page 35](#)). AngloGold has been instrumental in driving legislation towards a new approach to dust management within South Africa. These initiatives have informed the new "Guideline for Airborne Pollutants", published by the DME, which is now mandatory in South African mining. Initiatives with respect to refining engineering controls, dust filtering, and administrative and personal protective equipment continue, in an effort to provide a safer work environment.

New methods of measurement implemented on the South African operations have provided the basis for engineering control; these efforts have been rewarded by results that show that no employee in the South African region has been exposed to dust levels above the accepted safe levels for the last four consecutive quarters.

TB remains an important element in occupational health and in South Africa is classified as a compensable disease in silica-exposed employees. More effective detection methods are resulting in earlier diagnosis and treatment, which is limiting the onward transmission of the disease and reducing disability. Nonetheless, the increasing TB rates are a cause for concern and are directly related to the prevalence of HIV/AIDS.

Efforts to curb HIV infection are discussed in the HIV/AIDS section of this report.



5. Reporting in line with the Global Reporting Initiative (GRI) ^{LA}

Health and safety

Core indicators

LA5. Practices on recording and notification of occupational diseases and how they relate to the ILO Code of Practice on recording and notification of occupational accidents and diseases.

- Recording and notification of occupational diseases and injuries in line with AngloGold Safety and Health guidelines, informed by ILO guidelines and in compliance with country-specific legislation.

LA6. Description of formal joint health and safety committees comprising management and worker representatives and proportion of workforce covered by any such committees.

South Africa

- Joint safety and health committees in place at every operation, in line with the Mine Health and Safety Act. All working places covered by such agreements.

East and West Africa

Committees in place.

Additional indicators

LA14. Evidence of substantial compliance with the ILO guidelines for Occupational Health Management Systems.

Internal/External audit process.

- Internal – by Corporate Office and mines
- External
 - South Africa – British Standards Institute (BSI)
– National Occupational Safety Association (NOSA)
 - E&W Africa – Morila: function carried out by Corporate Office
– Others: NOSA
 - South America – NOSA
 - Australia – RISKMIN
 - North America – None (function carried out by Corporate Office)
- Statutory
 - South Africa – Department of Minerals and Energy (DME)
 - E&W Africa – Namibia – DME
– Mali – Institute Nationale Prevention Société (INPS)
– Tanzania – DME
 - South America – Argentina – Aseguradora de Riesgos Del Trabajo (ART)
– Brazil – National Social Security Institute (INSS)
 - Australia – Department of Industry and Resources (DOIR)/
Department of Business, Industry and Resource Development (DBIRD)
 - North America – Mine Aggregate Safety and Health Act (MHSA)

LA15. Description of formal agreements with trade unions or other bona fide employee representatives covering health and safety at work and the proportion of the workforce covered by any such agreements.

South Africa

- Example of agreement on website. 100% of all workplaces covered by such agreement and 100% of all employees.

East and West Africa

No formal agreements in place although participation is encouraged.

5. Reporting in line with the Global Reporting Initiative (GRI) ^{LA} (continued)

Health and safety

Core indicators

South America

Committees in place.

Australia

Committees in place.

North America

Committees in place.

Additional indicators

South America

No formal agreements in place although participation is encouraged.

Australia

No formal agreements in place although participation is encouraged.

North America

No formal agreements in place although participation is encouraged.

LA7. Standard injury, lost day, and absentee rates and number of work-related fatalities (including subcontracted workers).

These rates reflect injury-related absenteeism only.

South Africa

LTIFR:	10.40
Lost days:	36,111
Absentee rate:	0.24%
Absentee rate (including health related absenteeism):	2.90%
Work-related fatalities:	40

East and West Africa

LTIFR:	1.77
Lost days:	629
Absentee rate:	0.03%
Work-related fatalities:	2

South America

LTIFR:	4.48
Lost days:	2,007
Absentee rate:	0.20%
Work-related fatalities:	1

Australia

LTIFR:	5.54
Lost days:	85
Absentee rate:	0.03%
Work-related fatalities:	0

North America

LTIFR:	2.91
Lost days:	211
Absentee rate:	0.12%
Work-related fatalities:	0

LA8. Description of policies or programmes (for the workplace and beyond) on HIV/AIDS.

Yes. See HIV/AIDS section of the report.

6. Objectives for 2004

- Continue to provide medical surveillance examinations in South Africa, and improve on those currently undertaken in the East and West Africa region
- Continue efforts to minimise noise in the workplace and further reduce number of new cases of NIHL
- Continue to improve dust measurement and control, and reduce incidence of OLD by 50% from 2000 to 2004
- Monitor and manage the incidence of TB, including undertaking far-reaching research projects through Aurum
([See case study on page SH39](#))



7.1 Setting the standard – AngloGold contributes to Global Reporting Initiative

AngloGold Limited is a founding member of the International Council on Mining and Metals (ICMM) and has been a strong proponent of the ICMM's drive in support of sustainable development in this sector. An important part of the ICMM's recent initiatives has been the setting of reporting standards and, in particular, producing a mining and metals supplement in support of the Global Reporting Initiative (GRI). Work initiated recently by Dr Dave Barnes of AngloGold Health Service, in conjunction with representatives from Anglo American plc and the South African Chamber of Mines, could have a significant impact on safety and health reporting in all industries in the future.

Says Dr Dave Barnes, "It was apparent that the GRI was rather non-specific with respect to occupational safety and health reporting, so in developing the new mining and metals supplement we have taken the lead, which may be followed by other industry-specific GRI supplements in the future.

"Of note is the introduction of modern concepts such as the use of leading and lagging indicators. Leading indicators are of particular importance in occupational health as long latent periods usually precede the development of occupational diseases. Therefore the emphasis on contributing risk (leading indicators) is more important than counting up disease cases (the lagging indicators) 10 to 15 years later.

"The idea of deriving specific leading indicators from a particular mine's set of lagging indicators (occupational disease) was adapted from certain safety management systems.

"We anticipate that our contributions to the GRI mining and metals supplement will assist in raising the importance of proactive occupational safety and health management in mining."

The supplement will be published for comment by GRI in mid-2004, after which it is expected to be adopted by industry.

Specific leading health indicators for NIHL

Corrective actions:

A – Management attention required (*within 6 months*)

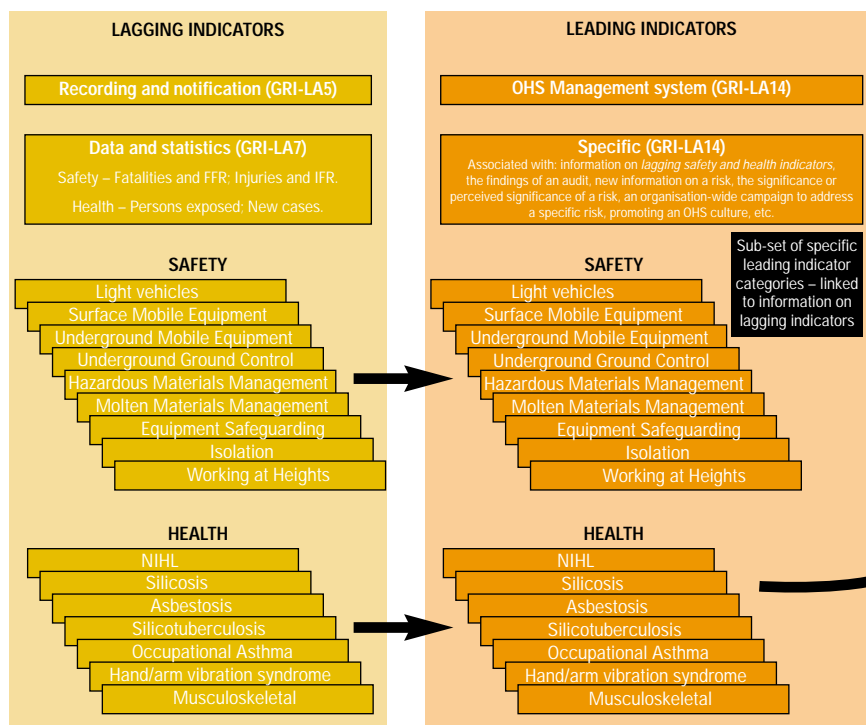
B – Attention required with time (*within 12 months*)

C – Deviation noted (*minor deviation only*)

Blank – This area is not applicable

	Compliance %	Severity of Non-compliance or Deviations			Comment
		A	B	C	
Noise					
1					Has a survey of noise levels been undertaken?
2					Is the frequency/octave profile of noise sources available and used in the treatment of this risk?
3					Have noise zones been demarcated? (Areas where the noise level is ≥ 85 dB(A))
4					Do you have a hearing conservation programme (yes or no)? If no score 0 and proceed to the next risk area, if yes score 3 and proceed with this section.
5					Are employees trained in the risks due to noise exposures?
6					Are noise characteristics requested for new machinery in the procurement documentation?
7					Is the approach to noise reduction in line with the order of priority in the "risk management guideline" i.e. eliminate, control at source, minimize exposure, PPE
8					If PPE is used, is the selection based on the characteristics of the noise source and audiometric information?
9					Is the PPE issued certified by the local (National) quality control authority (standards bureau)?
10					Is a PPE compliance monitoring programme implemented?
11					What is the percentage compliance with correct use of PPE? (1 – 30 = 1, 31 – 70 = 2, 71 – 100 = 3)
12					Are exposed employees subjected to regular audiometric monitoring of their hearing? Typically, employees exposed to between 85 and 104 dBA are monitored annually and those exposed to 105 dBA or greater are monitored 6 monthly. However, this may be different according to local medical advice or legislation.
13					Are employees retrained if they are found to show signs of noise-induced hearing loss?
14					Does information from the medical surveillance programme feed back into hearing conservation programme?

An overview of the reporting process using both lagging and leading indicators





South Africa

7.2 Improving dust control delivers results

The incidence of occupational lung disease (OLD) has decreased at AngloGold thanks to increasing efforts to improve dust control on the South African operations. Not only is this evident in declining cases of compensation for OLD, but monitoring of workplaces has shown a significant decrease in exposure to harmful respirable dust particles.

In the late-1990s an AngloGold team, as part of the Department of Minerals and Energy's (DME) Occupational Hygiene Sub-Committee (OHSC), identified improved measures to determine employees' exposure to respirable silica dust. Following representation by AngloGold to the DME to gain permission to change these methodologies at its Vaal River operations, a new method of monitoring employee exposure to dust was established across all of AngloGold's South African operations by the end of 1999. AngloGold's new methodology assisted in informing the development of the guidelines for a Code of Practice for airborne pollutants as issued by the Chief Inspector of Mines.

The implementation was undertaken in three phases:

- Respirable dust concentrations were determined for various geographical areas and activities on each mine;
- Next came the identification of critical occupations, based both on historical reported cases of OLD and continuous dust monitoring;
- Finally, this led to the development of new dust management tools (such as an automated computerised system to link measured exposures to employees' medical records, as well as a new personal dust monitoring system) and a new code of practice for AngloGold's South African operations.

In 2001, AngloGold established a Dust Steering Committee responsible for strategic issues relating to dust management. Says Des Wrigley, Manager Occupational Environment for the South African operations, "The steering committee aims to achieve a quantum reduction in dust exposure – by 50% from 2001 to 2004 – and we are seeing improvements."

In 2002, a Dust Technology and Innovation Supporting Team was established to evaluate best practice. The team comprises a range of occupational hygiene professionals/practitioners and meets on a monthly basis to share and review information and practices both within the company and the industry as a whole. If required, these are then adopted for implementation throughout AngloGold.

Both major and minor control initiatives have flowed from work to reduce dust exposure in identified high-risk areas, occupations and tasks. During the past two years these have included:

- A footwall treatment programme implemented at all South African operations has treated more than 200 linear kilometres in 2003. A harmless (molasses-based) chemical is sprayed on the footwall of major intake airways to trap the dust on the footwall and prevent it from becoming airborne.



- The cleaning of all vertical shafts and implementation of maintenance programmes. Old mud and dust accumulations, resulting from spillages, have been removed (by means of shovels, watersprays, etc) from the shafts. Programmes have been implemented so that any new mud spillages in the shaft are removed as soon as possible.
- The design and development of new and improved dust filtration plants suitable for different dust loads. This was done in conjunction with various dust filtration suppliers. Nine new design filter plants have already been ordered for installation at Kopanang mine and it is anticipated that more of these units will be purchased during 2004 to replace some of the existing filter plants that are not performing adequately.
- The identification of appropriate respiratory protection devices. This was done by first considering the dust filtration quality of various respirators and secondly by determining employees' preferences regarding respirators. The selected respirators were then placed on standard stock and a directive issued to ensure that only these respirators are used.
- Work to identify appropriate dust control mechanisms at ore passes, is undergoing trials at Tau Lekoa mine. Here, the ore transport hopper is equipped with low friction material to ensure that the ore is emptied correctly and completely. In the past some ore always remained in the hopper after it was emptied and the dust from this became airborne as the hopper moved into the intake airway. By employing the new methodology, no ore is left in the hopper. Dust concentrations in the intake airway are thus reduced and less airborne dust flows into the working areas of the mine.
- Development of a dust training video to enhance training of all employees with regard to dust management and personal protection. The video is currently being circulated to various committees for approval. After final approval the video will be used as an induction training tool to educate our employees on the dangers of dust and also on how to protect themselves against dust.

Programmes that are to be investigated during the year ahead include an in-stope water blast system. This system will ensure that the stope is automatically watered down directly after the blast and should result in employees being exposed to lower levels of dust when they enter the stope at the start of the next shift.

The treatment of entire intake airways across the operations is also planned (similar to the treatment applied to footwalls, but now also including the sidewalls) as well as an investigation into methodologies to reduce dust exposure resulting from blowing over and socket cleaning processes.

Says Des, "When we measure exposure we look at the concentration of dust. At the end of September 2003, no employees had been exposed to total respirable dust concentrations in excess of $1\text{mg}/\text{m}^3$ for four consecutive quarters. The number of homogenous exposure groups (which represent groups of employees in a working area who are exposed to approximately the same levels of dust concentration) exposed to quartz dust concentrations of more than $0.05\text{mg}/\text{m}^3$ was zero for the second quarter in a row. The limit specified by the Mine Health and Safety Act is $0.1\text{mg}/\text{m}^3$.

Although hazardous dust is less of an issue on open cast mines, the South African dust control teams have visited the Sadiola, Yatela and Morila mines in Mali and Geita Gold Mine in Tanzania and recommendations on dust control have been made to the respective management teams at these operations.



South Africa

7.3 Facing up to the challenge of silicosis

The issue of silicosis amongst mine workers on South Africa's gold mines was brought to the attention of the public during 2003 with the threat of a legal suit against a number of South African mining companies. But the issue of occupational lung disease or silicosis has long been a key focus area for AngloGold's safety and health team, and indeed is an issue which the mining industry as a whole has been grappling with for decades. At AngloGold, the significant efforts made in understanding, monitoring and managing dust control and the medical surveillance and attention attached to this, have yielded some success. ([See case study on page SH33](#)).

Intensive efforts have been and are still being made to prevent and identify early silicosis and at the same time to treat and compensate those who have silicosis from past exposure. The development of silicosis also leads to the increased risk of contracting tuberculosis (TB) which is further compounded by the presence of HIV.

Compensation for silicosis

Compensation for silicosis (and certain other occupational lung diseases) is provided for in the Occupational Diseases in Mines and Works Act (ODMWA) of 1973. The Act is administered by the Compensation Commissioner under the auspices of the national Department of Health. Submissions for compensation are routed via the Medical Bureau for Occupational Diseases (MBOD) for assessment of impairment.

Central to the legislation and the notion of the funding of compensation claims is that employees with an impairment are guaranteed compensation and the employer is protected from any subsequent civil claim.

Premiums levied on mines to fund this compensation are based on risk (calculated as a result of dust measurements made on mines). Currently, AngloGold pays 39 cents per employee per shift worked.

How the legislation has changed

The MBOD was established 100 years ago to effect medical surveillance and compensation for white miners. At the time, black miners were considered to be temporary on the basis that they were recruited by the industry on a nine-month contract. Also, black miners were not deemed to be susceptible to respiratory diseases as their total length of service (and therefore exposure) was generally much shorter than that of white miners. Black miners underwent medical surveillance examinations by doctors employed by The Employment Bureau of Africa (TEBA) and later by mine-based doctors.

Miners were first compensated under ODMWA in 1903. However, compensation awards under ODMWA were racially differentiated until 1993.

Prior to 1982, miners (black and white) who developed a certifiable disease in the first degree (which meant between 10 and 40% disability) were not allowed to return to work as their certificate of fitness was removed. This regulation changed in 1982 so that miners still fit to work (despite having early silicosis or cured TB) were allowed to continue working. ODMWA makes provision for free medical examination of ex-mineworkers at the MBOD in Johannesburg on a biennial basis. ODMWA also provides for post-mortem compensation.

Managing silicosis today

In addition to the programmes in place at the AngloGold operations today, every employee who works in a silica-risk environment has initial, periodical (three yearly) and exit medical examinations consisting of chest x-rays and lung function testing. AngloGold's TB control programme also requires that all employees exposed to silica dust have six-monthly x-rays to detect TB early, usually before the employee becomes ill and infective to colleagues.

Cases of early silicosis (that are not eligible for compensation) are dealt with in terms of AngloGold's Medically Affected Employees Policy (MAEP) where attempts are made to place the affected employee in a low-silica environment.

What is silicosis?

Silicosis, an occupational lung disease (OLD), is caused by the inhalation of free silica dust which is present in mining areas where quartz concentrations are high, as is the case in many deep-level gold mines. The silica dust is inhaled and causes a fibrotic (or scarring) reaction in the lung. Often there are no symptoms of the disease. In severe cases, breathlessness and coughing are principal complaints.

Silicosis should not be confused with asbestosis, a link that has been drawn by some parties with an interest pursuing legal action in SA. While silicosis is a serious issue and disease, uncomplicated silicosis is usually benign. However, there are further factors at work, particularly in the South African context. Silicosis predisposes individuals to the development of TB, especially when an employee is also HIV positive. Although research has shown that silicosis may lead to lung cancer, it is not associated with mesothelioma, which is the deadly form of lung cancer associated with asbestosis.

When employees are eligible for compensation, AngloGold makes prompt submissions to the MBOD and assists in ensuring speedy payment. Employees with first degree silicosis can continue working although they would be placed in a low-risk environment. Those with second degree silicosis would no longer be allowed to work in high-risk environments (such as underground, or in metallurgical plants).

Since 1999, AngloGold has made provision for ex-mineworkers to make use of its occupational health centres near Orkney and Carletonville for their biennial examinations.

To deal with the cases of ex-employees who may be suffering from silicosis and who may not have been compensated, AngloGold (through the Chamber of Mines) has offered to enter into a partnership with the State to identify such people so they may be treated and compensated. Specifically, AngloGold has offered to make available both its occupational health centres and rural health care facilities for assessment of impairment.

In conclusion, the issue of silicosis remains a challenging one for the industry, but one in which AngloGold acknowledges its role and its responsibility in working with the State and the industry as a whole to ensure that appropriate measures are in place to limit exposure now and in the future, and to secure compensation for those who may have been exposed in the past.





South Africa

7.4 Fitness for work – a scientific approach to matching employees to job requirements

Physical fitness is a prerequisite for jobs in many industries, but in the mining sector it is not only necessary in terms of productivity, but also fundamental to the maintenance of good safety and health. With this in mind, AngloGold Health Service (AHS) Occupational Health division has developed a functional work capacity (FWC) test battery to assess employees' physical abilities to undertake a variety of job-related tasks. The FWC test forms part of a suite of existing assessments (such as medical, physical and heat tolerance screening) and is directly linked to medical surveillance, a statutory requirement.

The FWC test comprises 19 elements simulating representative functional work abilities and embraces aspects such as mobility, work position and effort in both restricted and unrestricted work environments, as well as dexterity in different work positions. Overall work capacity is also assessed. Employees need only be assessed in those test elements crucial to their specific job requirements.

"The term overall fitness embraces both medical and physical fitness," says Tia-Mari Hofmann, who is an occupational therapist at the AHS West Wits Occupational Health Centre, "but excludes mental well-being and aptitude which is assessed through psychometric testing where necessary."

Medical fitness comprises satisfactory health as determined by a general medical examination and the absence of critical contra-indications or impairments as determined by a risk-based medical examination or medical surveillance. Physical fitness is a combination of age considerations, anthropometry and physique, and heat tolerance.

The 19 elements that make up the test simulate functional work demand – each element has a specific physiological workload that has to be completed in a reasonable time.

Says Tia-Mari Hofmann, "To avoid premature fatigue and the onset of heat disorders, self-pacing at a moderate work intensity is probably the most important counter. In the development of the FWC test, the norm or standard required was set at the individual's ability to undertake full-shift work at a rate which, at the very least, can be regarded as moderate. Normal healthy individuals, without any special endurance training, can generally achieve such work rates through self-pacing.

The FWC evaluation can be applied at three levels with each level having a specific purpose.

- **Level 1: Job allocation and re-allocation.** Assessments of FWC at this level are intended to provide a rating of full-shift work capacity of healthy, fit individuals. The performance ratings are expressed in terms of various categories which, in turn, facilitate job allocation and, if indicated, job re-allocation. All jobs of a physical nature in AngloGold were analysed according to functional requirements and the main tasks associated with each job were identified. There is an important distinction to be made between those tasks regarded as critical and those, although part and parcel of the job, regarded as being of secondary importance. Collectively, this information constitutes a particular job profile.

The FWC test battery can be tailored to the job profile and any employee, prospective or otherwise, rated in objective terms. Assessments are therefore specific and resource-effective.



Gert Geyer (left), with his supervisor Andre Olewagen from Mponeng mine

In 2002, Gert Geyer, then an electrician at Mponeng mine, was injured in a motor bike accident. He sustained a brachial plexus injury, leaving him with no elbow flexion and limited handgrip function of the left hand. Gert was referred for an FWC assessment to establish whether he could resume his normal duties. A judgement based purely on his physical appearance indicated that this would not be possible, but when he was evaluated on work samples that represented his physical job requirements, the assessment indicated that – although he had suffered a serious impairment – he had adapted so well to his limitations that he was able to perform work tasks in a safe and productive way. As a result Gert returned to his previous occupation as an electrician on the winders. His supervisor, Andre Olewagen, is very pleased with his work performance and indicated that he is a motivated worker and an inspiration to everyone with whom he works.

- **Level 2: Screening and rehabilitation.** FWC assessments at this level serve two purposes, namely the development of an FWC profile for the purpose of an overall assessment, and monitoring of rehabilitation.

Regarding rehabilitation, only selected FWC elements are used to monitor progress. A final assessment at this level may include all of the elements prior to proceeding to Level 1 assessments. Level 2 assessments represent a more advanced (strenuous) stage in rehabilitation, the entry level being Level 3.

- **Level 3: Rehabilitation.** The emphasis here falls on functionality and not on endurance. Specific elements will depend on the nature of the injury or limitation.

“The most direct benefit of an FWC assessment as far as the employee is concerned is that his physical skills, ability and work capacity are matched to a specific job or range of tasks. Premature fatigue and injury, and the short-term consequences of a mismatch between ability and demand, are therefore prevented or minimised.

“In the longer term, the benefit is sustained good health. Even in the event of injury or failing health, FWC assessments enable a realistic re-allocation of jobs and retention of rewarding careers.

“From an employer’s perspective, there are enormous gains in productivity, safety and health, and the retention of skills.”



Alfred Nikka during his vocational rehabilitation at the Functional Work Capacity Test centre.

Alfred Nikka, a sampler underground at TauTona mine, recently sustained a below-the-knee amputation owing to a medical condition. Alfred was initially tested on the FWC test battery after the completion of his acute rehabilitation phase to determine his current abilities and limitations to perform manual work. The FWC test battery's dual function of vocational rehabilitation was also used to rehabilitate Alfred. His rehabilitation was monitored by means of weekly FWC evaluations. When Alfred's functional work abilities reached a satisfactory level, a final work assessment was done on the FWC test battery. The results clearly defined Alfred's abilities and limitations in performing manual work. This information, gathered at the end of 2003, is assisting Human Resources in their search for a job where he can still continue working safely as a productive employee.



Benjamin Hlabahlaba

Benjamin Hlabahlaba was a stope team worker who was injured in 1981 when a mono-rope – a device used to transport underground wooden support packs to the workplace – amputated all the fingers of his right and dominant hand. After medical intervention and rehabilitation, he was given a clerical job on the mine, but he wanted to return to his original job. He was tested using the critical elements of the FWC test on load handling in restricted work areas and proved that, with only a pinch grip, he could perform this essential task in a safe and productive manner. His test scores complied with the standard set by healthy in-service employees and, as a result, he resumed his original work.



South Africa

7.5 The fight against TB – Aurum leads the way

A ground-breaking study is to be undertaken in the South African gold mining industry by Aurum Health Research, which is wholly owned by AngloGold. Aurum is a member of the international Consortium to Respond Effectively to the AIDS/TB Epidemic (CREATE), which in turn is funded by the Bill and Melinda Gates Foundation. The study, which has been submitted to the Bill and Melinda Gates Foundation and the Safety in Mines Research Advisory Council (SIMRAC) for funding, has an estimated budget in excess of US\$10 million and will be undertaken in collaboration with several gold mining companies, including AngloGold, the Departments of Health, Labour and Mineral and Energy Affairs, various labour unions and associations, and international scientists from the London School of Hygiene and Tropical Medicine and Johns Hopkins University.

Says Prof. Gavin Churchyard, head of Aurum Health Research, "CREATE was established in response to a growing recognition among TB and HIV experts that innovative and even radical approaches to TB control will be necessary to reverse the alarming trends in the incidence of these diseases that have been exacting a devastating toll on societies in the developing world."

During the 1990s it became apparent that, despite meeting World Health Organisation (WHO) targets for tuberculosis (TB) detection and cure, the incidence of TB among employees in the South African gold mining industry had risen sharply. As a result, TB is now the principal cause of death in the workforce with a five-fold increase in the rates of TB coinciding with the onset of the HIV epidemic in South Africa.

A comprehensive TB-prevention programme, which included all aspects of the WHO's TB control strategy as well as x-ray screening, was unsuccessful in reducing the incidence of TB. Consequently, an alternative approach is being investigated and plans are presently underway to determine the likely effects of a community-wide TB preventative therapy on TB rates in the South African gold mining industry.

The rationale supporting this approach is that all individuals at risk of developing TB in the population would be treated rather than only those identified as being high-risk, such as those who have the HIV infection or silicosis. Furthermore, if successful, such a programme would reduce the transmission of TB between people, which would lead to fewer TB cases occurring later, thus resulting in improved control of the disease.

The aim of the study is to investigate the effect of preventive therapy on TB prevalence rates among miners in the South African gold mining industry. The specific objective is to compare the efficacy of nine months of TB preventive therapy using the TB drug Isoniazid offered on a community-wide basis, with that of standard care as currently practised in the gold mining industry.

According to Prof. Churchyard, "the aim is to identify and evaluate novel strategies to reduce the incidence of TB in groups with high rates of HIV and TB infections. It is imperative that novel and effective public health strategies are developed. This is particularly so for the gold mining industry which has a high burden of TB."

TB has a high social and economic cost, both for the individual concerned and the industry as a whole. It is both an occupational and a compensable disease. Improved health on the part of employees of the gold mining industry would lead to improved quality of life, improved productivity and much reduced costs.

This study is scheduled to begin in the first quarter of 2004. The findings of the CREATE research portfolio will be used to develop new global policies to combat TB/HIV, a key criterion of projects which the Bill and Melinda Gates Foundation supports. CREATE will make a major contribution to identifying efficacious strategies to reduce suffering and death from HIV-related TB worldwide.



East and West Africa

7.6 Stamping out malaria for good

Malaria is a life-threatening parasitic disease that is endemic in many of the areas where AngloGold owns and operates mines. Malaria has a significant impact on both the productivity of employees and the functionality of surrounding communities.

Says Dr Dave Barnes of AngloGold Health Services (AHS), "There are about 153,000 people living within the vicinity of mines in the East and West Africa region, of which 3,840 are employees. By putting in place the necessary measures to combat malaria, we can have an enormous impact on our employees' health, as well as that of the people in the local community.

"AngloGold's malaria intervention programmes draw on international standards and best practice. To ensure that the programmes benefit the countries and regions in which we operate and that they are sustainable after we have left, we actively pursue partnerships with the Roll Back Malaria ([see box](#)) Global Partnership and the Medicines for Malaria Venture (MMV). Added to that, country-specific co-operation and consultation with the World Health Organisation and local governmental offices are integral to our approach."

Says Dr Dave Barnes, "An exemplary approach to malaria control is apparent at the Morila mine in Mali. Here, a committed mine management team has been instrumental in reducing the malaria incidence rate among employees from a peak of 32% of employees in August 2000 to 6.3% in August 2003, despite August traditionally being the month with the highest incidence rate."

The multi-faceted programme adopted incorporates all the recognised elements of a malaria control programme, including vector (mosquito control) and the provision for early diagnosis and correct treatment of malaria cases. Epidemiologically-guided monitoring of programme effectiveness is important.

Dr Fanie Jute, Manager, Medical Services who is responsible for the malaria management programme at Morila explains, "During February 2003 we conducted research among employees, on the chemoprophylaxis usage patterns and other methods of personal protection. We used the information as part of our ongoing education campaign which includes posters in English and French, articles in Morila Morale, our monthly newspaper, information sent via email and through personal contact during visits by employees to the mine clinic.

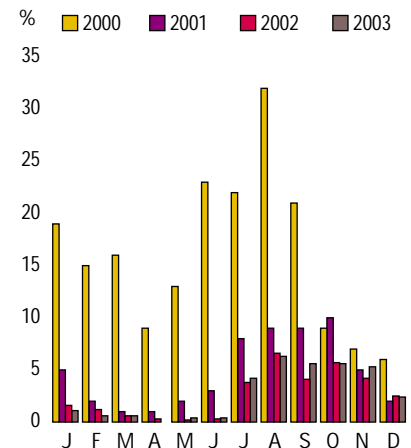
"The importance of taking responsibility for one's own health is emphasised in all our programmes, with a great deal of emphasis placed on educational awareness and measures to avoid being bitten, as these are the areas that will be sustainable once mining ceases," says Fanie.

The programme is based on what is commonly known as the ABCD of malaria protection, namely:

- Risk **Awareness**
- Avoidance of being **Bitten**
- **Chemoprophylaxis**
- Early **Diagnosis** and treatment

"Unfortunately," says Fanie, "compliance among expatriates, in particular with regards to malaria chemoprophylaxis, remains a problem so the ongoing educational campaign is important."

Percentage malaria cases amongst employees



Malaria threat increasing in Africa

Malaria is a life-threatening parasitic disease transmitted by mosquitoes. The parasite is transmitted from person to person by the bite of the female Anopheles mosquito, the most efficient and deadly of mosquitoes, which requires blood to nurture her eggs.

Although this disease was once widespread, it was successfully eliminated from many countries with temperate climates during the mid-20th century. Today, the vast majority of malaria deaths occur in Africa south of the Sahara. There are at least three million acute cases of malaria each year, resulting in more than one million deaths. Around 90% of these occur in Africa; mostly young children. Malaria is Africa's leading cause of under-five mortality (20%) and constitutes 10% of the continent's overall disease burden.

Not only is malaria a significant health risk in Africa, but it also has an enormous cost – estimated at more than US\$12 billion each year in lost GDP. It accounts for 40% of public health expenditure, 30-50% of in-patient admissions and up to 50% of out-patient visits in areas with high malaria transmission.

Another important element of the programme to combat malaria is the bed net programme that began in 2002, with about 1,000 nets having been distributed to date. A follow-up net programme is currently being planned to ensure that every employee (and their dependents) has a bed net. To this end, the company's revised net policy will provide a net to cater for all employees during the first year of their contract and subsequent nets will be made available at a subsidised rate to employees and contractors.

In terms of environmental control, so called malaria "hot spots" were identified and the areas were filled with laterite to eradicate freestanding water puddles. This was a particularly problematic area during 2003 as there was much more rain than the previous year.

During the year ahead, the problem of water seepage below the fresh water dam will be addressed to reduce the number of puddles or potential mosquito breeding habitats. The fresh water dam itself does not pose a problem as its edges are kept clear and the dam is stocked with fish that eat any mosquito larvae that hatch in the dam.

Says Dr Jute, "Professor Richard Hunt of the School of Animal, Plant and Environmental Sciences, University of Witwatersrand was commissioned by Morila to conduct research on insecticide resistance patterns in mosquito populations on site and in the villages surrounding the mine. The final report is being used to drive the vector control programme and will ensure that appropriate and environmentally friendly insecticide is used at the mine and in the local villages immediately adjacent to the Morila mine. A malaria and public health control specialist was commissioned by AngloGold to assist in the practical aspects of insecticide spraying. This has ensured appropriate training and the use of the correct equipment. His recommendations will form an integral part of the vector control programme in future."

Feedback on the incidence of malaria is given bi-weekly at mine management meetings, as well as in a monthly departmental report. The structure of reporting incidences has been adapted to ensure accurate assessment of the efficacy of the new vector control programme as it now also includes high-risk groups such as pregnant women and children under five.

Similar programmes are now being planned for implementation at other mines in the region.

Roll Back Malaria – a global initiative

The Roll Back Malaria (RBM) campaign is a global partnership founded in 1998 by the World Health Organisation (WHO), the United Nations Development Programme (UNDP), the United Nations Children's Fund (Unicef) and the World Bank with the aim of halving the world's malaria burden by 2010. RBM promotes four main strategies:

- Prompt access to treatment
- Insecticide-treated mosquito nets;
- Prevention and control of malaria in pregnant women; and
- Malaria epidemic and emergency response.



A bed net programme is one of the methods employed in an effort to combat malaria at Morila.



East and West Africa

7.7 A model occupational health centre at Navachab

The Navachab mine in Namibia is one of the smallest of the AngloGold operations, but its size and remote location belie its efficient operation. This applies equally to its small but efficient occupational and primary health care centre, which has made enormous strides in recent years and is now viewed as a model for other similar operations. The mine is situated in the central Erongo region about 10km from the tranquil town of Karibib, surrounded by mountains. The nearest small state hospital is 30km away at Usakos.

Permanent employees are accommodated in company housing with their families and are all on a co-contributory medical scheme. Some contractor employees are accommodated in hostels. A trade union agreement is in place with the Mine Workers Union of Namibia (MUN). Following recent expansions, the life of mine has been extended to 2013.

Excellent safety performance has been recorded at the mine for many years, but occupational health practices were lagging. To address this, AngloGold Health Service was contracted to oversee the planning and co-ordination of occupational health in 1999. This has proved to be a recipe for success, says Dr DB de Villiers, the Occupational Health Practitioner at AHS who oversees this function.

Where necessary, external experts are brought in to provide professional advice. For example, when it was found that a number of procedures were lacking during mill relining, Dr Johan Kielblock, Consultant – Occupational Hygiene for AHS, visited the mine and produced a code of practice for mill re-lining. Dr Kielblock is an internationally recognised expert in heat stress management and has wide experience in drawing up guidelines for South African legislation.

Says Dr De Villiers, “When AHS first got involved, local general practitioners conducted occupational medical surveillance examinations at great cost to the mine. These examinations were not risk-based and records did not meet accepted Occupational Health standards. No exit medical certificates were issued and no formal medical surveillance programme for contractors was in place. Not all the necessary equipment was available on the mine and few links existed between occupational hygiene and occupational medicine. Documentation in regard to emergency preparedness was rudimentary. The only available ambulance was in a poor condition and the availability of emergency equipment was inadequate. Patient records were patchy and unreliable and occupational health reporting was rudimentary.”

To address these issues:

- Several guidelines for occupational health matters were introduced.
- Occupational risk exposure profile documentation was initiated, resulting in risk-based medical surveillance being carried out for the first time.
- Periodical and exit medical certificates were introduced.
- The clinic sister visited the South African operations to observe occupational health programmes in practice.



Since those first days significant strides have been made:

- Health performance reporting has developed from a rudimentary primary health care and basic medical surveillance activity report to a fully integrated occupational health, safety and primary health care report. Annual reports are produced in line with South African legal requirements, although this is not yet mandatory in Namibia.
- Regular audit of the occupational health system is in place.
- An agreement has been reached with a local occupational medical practitioner to assist with day-to-day occupational health problems which may arise and cannot be dealt with telephonically or timeously by AHS.
- Cyanide emergency training has been completed for all plant, maintenance and laboratory personnel and has also been extended to staff from Usakos State Hospital. Contact has been established with Windhoek State Hospital, should the unlikely need arise to evacuate mine personnel to Windhoek.
- Occupational and primary health care record systems have been streamlined. An investigation into more efficient electronic record keeping is being undertaken.
- Codes of Practice for Minimum Standards of Fitness to work, Medical Surveillance and Substance Abuse Screening have been finalised and are in practice.
- Initial (1999) action plans and goal setting have evolved from a long list of problem areas to a manageable short list.
- A comprehensive HIV/AIDS programme is in place. (See case study in the AIDS section of this report).

Says De Villiers, " The mine clinic has been extended to accommodate the necessary occupational medical surveillance equipment and allow adequate space for the primary health care function.

A new ambulance was recently commissioned so Navachab is now suitably prepared to address any expected medical or surgical emergency.

None of this would have been possible without dedicated attention and commitment from the Navachab management team, especially the General Manager, Frank Bethune and the Safety Health and Environment Manager, Elsabe Farmer.



South America

7.8 Morro Velho in partnership with local communities

Morro Velho in Brazil, in partnership with local municipalities, communities and other institutions, recently contributed US\$198,000 to the establishment of the Reference Centre for Pneumology in the town of Nova Lima. An additional US\$100,000 was allocated towards consultations and medication during 2003.

Morro Velho and the town of Nova Lima are almost synonymous, with the company having drawn its employees largely from the people that reside there over the past 100 years. Although silicosis is currently not a threat to the health of employees – only one case has been reported in the past six years – the disease was frequently undetected and untreated in the past.

This has now changed, thanks to the new Reference Centre. The centre, which provides free services for the diagnosis and treatment of silicosis and associated diseases, has its own team of specialist physicians, including ancillary services such as social work, physical therapy and a pharmacy.

The centre, which was inaugurated in May 2003, is the largest of its kind in the country and offers out-patient treatment only. However, should patients require hospital treatment, they are referred to the Nossa Senhora de Lourdes Hospital, adjacent to the centre. To date, more than 5,000 former employees have been assessed. In addition to the medical assistance given to all patients, social workers are also on hand to assist the individual and the family in dealing with the illness, and with financial and family-related issues. Former employees who were found to have silicosis are also eligible for compensation.

The centre is engaged in partnerships with universities and research centres in furthering studies on lung disease.



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