

Case Studies

The following case studies present examples of HSEC issues, initiatives, projects and programs across the Group and highlight some of the challenges faced by our operations in translating policy into practice.

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Developing a 'hierarchy of control' approach to managing our occupational health exposures

Across our Company, there are a variety of site-based exposures that have the potential to cause long-term health effects. The most appropriate approach to these risks is to reduce exposure to the individual. Personal protective equipment (PPE) has been a customary form of protecting employees from adverse exposures. However, in applying a 'hierarchy of control', our goal is to reduce the potential exposures in an absolute sense.



▶ Alan Emery, Engineering Manager, conducting a safety talk 80 metres underground at Khutala Colliery, South Africa

The 'hierarchy of control' approach involves methods to decrease the exposure source itself or to minimise the potential amount of employee contact. At the highest level, this involves removal of the exposure or substitution of the exposure to one with less or no harmful effects. Where the exposure source cannot be removed, there may be direct engineering solutions that can be employed to significantly reduce the exposure. This is particularly the case in responding to the problem of noise generated from machinery, which is a focus at a number of our operations.

PPE sits at the lower end of the 'hierarchy of control'. However, it is still a very important element in the efforts of mining and smelting industries to ensure the health of employees is not adversely affected. It is important that PPE programs are well managed. This includes selection of appropriate equipment for the exposure, adequate training of employees in use of the equipment, high standards of maintenance, and a system for ensuring compliance in the use of the equipment by all employees.

The target for our operations is to reduce exposures over time through a 'hierarchy of control' approach. A long-term aim would be to create a work environment where PPE is not required. However, in the interim, correct use of PPE remains critical to ensuring the health of our employees while programs to reduce exposure are implemented.

Noise is a significant exposure for employees in the mining and minerals processing industry. The application of engineering processes, particularly through the use of barrier and insulation techniques, may reduce exposure to a point where no hearing protection is required by employees. Our Iron Ore operation at Port Hedland, Australia, has recently installed fibreglass insulation in the crusher plant, which has significantly reduced noise levels in this area. They have also fully enclosed the blower units in the beneficiation plant, which has reduced the level of noise to below the exposure limit. The progress in noise reduction at the site is reinforced by a 'buy quiet' policy that has been developed through Engineering Services.

Noise and dust are constant sources of adverse exposure for those in underground mining in the coal industry. At our Khutala coal mine in South Africa, specific attention has been given to engineering underground mining machinery to enclose the cabins of operators. This has markedly reduced the noise and dust exposure. Another exposure for underground coal miners is that of diesel particulates. Our Illawarra Coal operation in Australia has been sponsoring a study of this exposure over many years, and a high-quality filter mechanism to reduce diesel particulate exposure in this group has now been developed.

Another good example of where we are employing the 'hierarchy of control' approach to reduce employee exposure is at our copper oxide plant in Tintaya, Peru. By applying world's best engineering processes, emissions of sulphuric acid from the system have been significantly reduced. Although emissions are now well below current exposure standards, employees still wear PPE as added protection to ensure minimum adverse effects.

In the aluminium industry, it has long been known that the smelting process can induce asthma in employees. Older forms of this smelting process are more prone to emissions that may produce asthma. At our Bayside aluminium smelter operation in South Africa, where these processes are used, guards and extraction units have been installed to significantly reduce exposure for employees.

As with many other areas of health management, occupational health requires a strong focus on prevention and therefore reduction of harmful exposures. A preventive approach to managing our health issues will focus our attention towards the concept and design phase of new operations, to ensure potential health exposures have been minimised as much as possible. Our targets reflect this as we seek to achieve a year-on-year reduction in the number of our employees who would be exposed above occupational exposure limits, if not for the protective effect of PPE.

Health programs in southern Africa help provide care for HIV/AIDS patients



Many of our businesses in South Africa and Mozambique are in areas where the incidence of HIV/AIDS is among the highest in the world. In fulfilling our responsibility to care for our employees, we have developed support programs to help prevent them from acquiring the disease or, in the case of patients, to receive appropriate treatment. In line with our Charter, we are also assisting the broader community to cope with the effects of the epidemic by participating in a range of projects with government, community organisations, NGOs and industry groups.



► Ethembeni Care Centre, Zululand



► Metalloys hostel under conversion to the Kotulong community support centre

In recognising the severity of this devastating health issue, our sites have put into place various strategies to limit the impact of HIV/AIDS on our employees and our operations. These include supporting educational and awareness programs; promoting healthy lifestyles; and, in collaboration with trade unions, arranging anonymous testing and counselling.

To contain and better manage the problem, operations focus on local recruitment in preference to intakes of migrant workers and encourage private home ownership over high-density accommodation.

In South Africa, the Company contributes to each employee's remuneration package to enable them to become a member of a medical aid fund. Membership has given all employees and their families access to private health care. The medical aid schemes to which our employees belong now provide anti-retroviral treatment and treatment for HIV/AIDS-related illnesses. A similar program is in development in Mozambique.

As an example of our community-based projects, our Hillside and Bayside aluminium operations in Zululand support the Ethembeni Care Centre. Its name meaning 'a place of hope', Ethembeni provides infected patients with rehabilitation, respite and palliative care. The centre recently moved from makeshift premises to a large new community-owned support facility known as Amangwe Village.

Ethembeni has a 45-bed ward for adult patients and a 16-bed paediatric ward. The trained staff offer confidential HIV testing, counselling, medical consultations, lifestyle management workshops and training for designated care-givers and community support groups.

Positive Health Support group meetings are held regularly for former patients and their families, and community health care coordinators are trained to organise similar meetings in other areas. Outside the centre, staff conduct HIV/AIDS education programs in schools, churches, and community centres.

Ethembeni also supports the South African Food Gardens Foundation Program that provides for the nutritional needs of HIV/AIDS patients and encourages people to follow immune-building diets.

Our Metalloys operation, located in the Gauteng Province of South Africa, has converted its redundant hostel complex, originally constructed to house migrant workers, into the Kotulong community support centre.

The centre aims to enhance the quality of life of people infected or affected by HIV/AIDS by providing support, encouragement and self-development opportunities.

Facilities include a hospice for terminally ill patients, residential units for the care of children orphaned by HIV/AIDS, a central kitchen and multi-function dining hall, library, administration offices, recreation areas and gardens.

In Mozambique, the Mozal Community Development Trust is supporting an HIV/AIDS prevention initiative known as the Total Control of the Epidemic program. The program's initial cell targeted the Boane District, the area in which the smelter is located. The second cell focused on the Polana-Canica area in Maputo city.

At the inception of the program in 2000, 100 trained field officers were tasked with contacting 2000 people each. To date over 200 000 people have been contacted and informed about HIV/AIDS.

The team's mission has been to educate the community about the prevention of HIV/AIDS, encourage people to ascertain their status by being tested, and direct those suffering from the disease to facilities where treatment is available.

The Trust also supports the Government's voluntary testing centres situated in Maputo and surrounding areas. The Boane testing centre is run by trained professionals, assisted by volunteers, who offer testing and counselling for members of the community.

Malaria control programs in Mozambique and Brazil are proving effective



Southern Mozambique, where our Mozal aluminium smelter is located, is an area where malaria is a major problem. We are supporting government initiatives to control malaria in order to improve social conditions and enhance the economic potential of the region. In Brazil, the northern state of Pará has the highest incidence of malaria in Latin America. In the county of Oriximiná, where our Mineração Rio do Norte (MRN) bauxite operation is located, a malaria control program we are supporting is also helping to alleviate the impact of the disease.



► Mosquito control spraying, Mozambique



► Malaria testing, Mozambique

The Lubombo Spatial Development Initiative (LSDI) is a program established by the governments of Mozambique, Swaziland and South Africa to develop the Lubombo region – southern Mozambique, eastern Swaziland and north-eastern Kwa-Zulu Natal – into a globally competitive economic zone.

The success of the initiative is threatened by malaria, which not only causes tragic loss of life but also impacts on productivity and tourism. In collaboration with the LSDI team, we have played a key role in implementing a malaria control program in the region around our operations.

The program involves the spraying of buildings and homes in the region and controlling mosquito breeding sites. Around 65 000 dwellings have been sprayed to date.

Other initiatives include the establishment of a dedicated malaria laboratory to facilitate early diagnosis and treatment. Bednets are being distributed to homes; and community awareness is being raised through educational activities, including local theatre performances.

Since the spraying program began in 2000, surveys show a significant decline in mosquito numbers and the rate of infections. There was a 50 per cent reduction in the incidence of malaria during the period 2001 to 2002 and a further 50 per cent reduction from 2002 to June 2003.

In the state of Pará in Brazil, the communities of the region are scattered along 250 kilometres of the Trombetas River, a tributary of the Amazon. The aim of the program is to reduce mortality rates and improve the quality of life of these riverside communities.

The program supports a malaria prevention team based at the local Porto Trombetas hospital. Their focus is to raise community awareness of ways to control and avoid malaria. They carry out a mosquito control spraying program and promote such activities as using bednets, installing screens on windows and doors, and not allowing still water to accumulate near homes.

The team faces numerous challenges. Incidence is highest during the few months of low and high water, but it takes time for spraying teams to visit the communities, as most can only be reached by boat or trekking through the jungle. The village huts mostly have neither windows nor doors, so mosquitoes have easy access; and cultural traditions mean changing habits can be slow.

Despite these difficulties, the vigilant team is achieving significant results, with reported cases in the region falling by 96 per cent since 1999.

Cardiovascular assessment at Tintaya studies potential high-altitude health risks to employees' children



Our Tintaya copper operation is located at Espinar in the Peruvian Andes, 4000 metres above sea level. Recent medical reports from China indicated that life at high altitudes may pose a risk to cardiovascular function of children. Our medical team at Tintaya, concerned at the reports, decided to conduct an assessment of the children of families living in the employee accommodation quarters. A full cardiovascular examination was carried out; and, in general, it was found that the children's growth and cardiovascular functions were healthy. The conclusion from the assessment was that the children at Tintaya were fundamentally healthy and that life at high altitudes does not represent a risk to their health, growth or cardiovascular function.



► Dr Manuel Muro, Tintaya Health Superintendent, with Dr Susan Niermeyer, University of Colorado Health Sciences Center, at the hospital at Tintaya



► Dr Susan Niermeyer and Dr Manuel Muro with Alberto Pacheco (centre), Head of HSEC, Tintaya, at the school

Many communities in Peru and throughout the world live at high altitudes. When mining projects are established at high altitude, they encourage the migration of workers and their families, who then live at or near their workplaces. In high-altitude environments, the amount of oxygen decreases progressively with altitude. Acclimatisation and adaptation mechanisms in the body are triggered, particularly at the cardiopulmonary level, in order to lead a healthy life at the high altitude.

The medical reports from China concerned the Tintaya medical team because they included cases of severe pulmonary hypertension in children, some of which were fatal. To conduct the study, the team engaged the support of noted specialists in the field, including Dr Susan Niermeyer, a well-known paediatrician, neonatologist and researcher of high-altitude impact on children at The Children's Hospital of Denver; Dr Luis Huicho, a paediatrician at the Child Health Institute in Lima; Dr Emilio Marticorena, a cardiologist with over 35 years' experience and research at high altitudes; and Dr Edgar Gloria, a cardiac ultrasound specialist with paediatric experience from the National Heart Institute of Lima.

The assessment was carried out between October and November 2002. A total of 326 children were examined, representing 98.5 per cent of all the children residing at Tintaya. The few not included were away at the time. Conducted with the full consent of the families, the project involved a range of components including:

- a home survey to identify all the children living at Tintaya, their place and date of birth, population ancestry, time of residence at the site, travel undertaken, and family and pathology history
- information sessions with parents and teachers
- assessment of the children's body size, proportions and vital signs
- medical assessment
- electrocardiogram
- ultrasound of the heart

- haemoglobin measurement (testing one drop of blood obtained by micropuncture).

The project was not without its challenges. Apart from assembling the team of specialists and coordinating the children's availability through the two-week exercise, cardiovascular assessment of children of various age groups requires infrastructure and equipment tailored to the purpose. Portable medical equipment was made available, along with electrocardiogram and ultrasound equipment suited to the smaller body sizes of children.

The assessment was coordinated with the families and schoolteachers, so the children could be available for their medical examinations without interfering with their schooling. Vehicles were made available to transport the children to the hospital and then return them to the school or to their homes.

The results showed that, although there were identifiable differences in cardiovascular development, most children examined enjoyed good health, full activity and normal growth. No cases of symptomatic high-altitude pulmonary hypertension were identified. Five cases of congenital cardiopathies were discovered, representing 1.5 per cent of the children in the study; this percentage is not statistically different from figures found in populations living at sea level. The five children received appropriate medical treatment for their condition.

The conclusion that the children at Tintaya were fundamentally healthy and that life at high altitudes does not represent a risk to their health, growth or cardiovascular function must be interpreted in light of the population resident at Tintaya. Most children have some native high-altitude ancestry that likely aids in their adaptation to the environment. Other populations, such as the Han (Chinese) or northern Europeans, who do not have a genetic history at high altitude, may respond differently.

The scientific knowledge gained from this study is being made available for use in other research projects into children's health, with particular benefit to the thousands of communities living at high altitudes around the world.

Large-scale occupational health study at Cerro Matoso includes a pioneering epidemiological monitoring program



As part of the collective bargaining agreement process at our Cerro Matoso ferronickel smelter in the province of Cordoba, Colombia, it was agreed to conduct an occupational health study. The year was 1998, and the Antioquia University was selected as the independent institution to carry out the study. As well as reassuring our employees that their work is not affecting their health, the study has resulted in a major advance in large-scale epidemiological monitoring.



► Medical monitoring at Cerro Matoso health centre



The occupational health study that commenced at Cerro Matoso in 1998 covers five areas: visual health, hearing health, respiratory health, absenteeism and cell-genetic bio-monitoring.

To establish a sound foundation for the study, databases for each area were developed. Built up over two years, these were based on information gathered from all employee occupational health examinations at Cerro Matoso since 1982. For example, readings of all workers' thorax x-rays taken throughout the previous 16 years were incorporated.

While every worker's clinical history was transferred to the databases, care was taken to preserve the anonymity of each individual, in accordance with International Labour Organisation guidelines.

These databases not only provided the source data for the study, but also facilitated development of the monitoring systems for the pioneering cell-genetic bio-monitoring program. With 210 participants, the program is the first study of its type in the world – a world-class technical and scientific achievement. A key benefit from the program is that the monitoring systems can be applied to any working population worldwide.

Specialist assistance was brought in as required. For instance, definition of the cell-genetic study was conducted with a group of international experts from the Nickel Producers Environmental Research Association (NiPERA), McMaster University and John Hopkins University.

In the area of absenteeism, the human resources team carried out an analysis of general absenteeism over the period, incorporating existing records showing where occupational health issues contributed to absenteeism.

Conducting the study presented a number of challenges, key among them being the management of such large volumes of data and then gaining the confidence of workers on the accuracy of the results.

Results from the study were made available to all employees in a series of booklets and also presented to the Occupational Health Labour Committee.

Based on the results, recommendations were made in relation to procedures and equipment purchases, and these have been implemented. Subsequent surveys have shown increased peace of mind among employees regarding the effectiveness of the Company's occupational health programs and an overall reduction in occupational illnesses at Cerro Matoso.



In our drive to achieve zero fatalities, new Fatal Risk Control Protocols set minimum performance expectations for managing critical safety risks at sites

Following the BHP Billiton merger in June 2001, a review of safety performance over the previous ten years was conducted across the organisation. The study identified that, of the total fatalities that had occurred, 94 per cent were single fatality incidents. This finding has focused our attention on the key risk areas that have historically contributed to fatalities within the Company. Fatal Risk Control Protocols have now been developed as a key component of our Safety Strategy. We are committed to eliminating fatalities from our operations.



► Mobile equipment interactions



► Molten materials management

In implementing the Safety Strategy, it is vitally important that our people believe it is possible to work injury free – regardless of their role or location. Our strategies in working towards this goal have been in three main areas:

- leadership effectiveness
- behaviours and awareness
- rigorous standards and procedures for managing key risks.

All three strategies focus on our people and systems, with two key objectives:

- ensuring that our practices, procedures, conditions, equipment and behaviour all contribute towards creating a workplace where it is possible to work without adverse impact on people, the environment or the community
- developing our people to make the right decisions as they go about their day-to-day work.

Following the review of past fatal incidents, nine areas were identified that required more stringent controls. These are:

1. Light Vehicles
2. Surface Mobile Equipment
3. Underground Mobile Equipment
4. Underground Ground Control
5. Hazardous Materials Management
6. Molten Materials Management
7. Equipment Safeguarding
8. Isolation
9. Working at Heights.

Protocols have been developed for each of these risk categories. The requirements under each Protocol are classified into three broad focus areas – plant and equipment requirements, procedural requirements and people requirements.

People from across the Company worked in teams to help develop the Protocols. As part of the process, the teams looked at internal standards and reviewed those of peer companies.

The nine Fatal Risk Control Protocols are being implemented throughout the Company. Full implementation is planned for completion by June 2005.

Our Energy Coal CSG has developed a review process to monitor and drive the effective implementation of these Protocols. Known as the Fatal Risk Peer Review, it looks at the adequacy of fatal risk management processes and controls in place at a mine, including the Fatal Risk Control Protocols, as well as compliance with those controls. Opportunities for improvement are identified; and, at the end of the review, recommendations are presented to mine management for all identified hazards.

The Fatal Risk Peer Review process was successfully piloted at Ingwe's Middelburg mine last year. Since then, Khutala, Reitspruit, Koornfontein, Optimum, Douglas, Zululand Anthracite Colliery, Navajo and Mt Arthur Coal have participated in similar reviews.



The road to Zero Harm at the Mozal 2 expansion project



Mozal 2 is a brownfield expansion of the Mozal primary aluminium smelter located at Maputo in Mozambique. The expansion, which essentially doubles capacity, was approved in June 2001; and construction commenced immediately. The first hot metal was produced in April 2003, and it is expected that full production will be achieved in the last quarter of 2003. At the peak of construction, almost 5000 people were employed on the site. During construction, classified injury frequency rates had risen to unacceptable levels. The introduction of a Zero Harm safety program has produced outstanding results.



► Construction of potroom, Mozal 2 expansion project

The challenge of achieving Zero Harm was introduced at Mozal 2 in April 2002, ten months after construction had commenced. From that time, the reporting of Classified Injury Frequency Rates (CIFRs), not just lost time injuries (LTIs), began to be implemented by the project team. A classified injury is any workplace injury that results in the person not returning to their unrestricted normal duties after the day on which the injury is received.

When the project team analysed the CIFR data over the months since construction had commenced, they found the rate had been increasing alarmingly. It became clear that a safety system based on changing behaviour was needed. However, the average time spent by a worker on the site was a little over six months – not much time to win over someone's heart and mind.

Local Mozambicans contributed around 69 per cent of the workhours on the site. For the large majority of these workers, their only training and experience had been gained during their time at Mozal. Language and cultural differences also had to be taken into account.

A dramatic improvement in the safety culture on the site was needed, along with the implementation of a comprehensive behavioural-based safety program. After a slow start in terms of performance improvement, the results of a lot of hard work began to be seen in September as the CIFR trend turned around. A rapid reduction in the CIFR then occurred; and by February 2003, the monthly rate was down to zero. Through to 30 June 2003, the CIFR remained at zero, and over 3.3 million workhours had passed without a classified injury.

A campaign of presenting the Zero Harm message to the CEOs of all the contracting companies on the project had commenced in October 2002. Then followed workshops with the direct contractors, site managers, front line supervisors and the workforce. By March 2003, across the entire site, there was total awareness of the safety team and its goals and the importance of Zero Harm, and all workers understood their individual role in the safety program.

At about the same time, an on-the-job behavioural observation program and near-miss reporting system were implemented, together with an information system that enabled the project team to identify the principal causes of incidents and the poor performers. The worst performing contracting companies were individually encouraged to produce safety systems that would make a difference.

Around December 2002, lead indicators were introduced to improve the level of proactive safety management. These indicators included compliance with personal protective equipment requirements, numbers of safe practice observations completed against target, and numbers of people who are aware of the risks associated with a task.

It was recognised that the most important factor in improving safety performance is visible safety leadership, which means every manager and supervisor setting an example by getting out of the office, walking around the site, engaging with the workforce and actively promoting safety.

When there is a safety problem on the Mozal expansion project, it is fixed immediately, even if it means stopping production. For example, fatigue was identified as a major contributor to accidents. It was discovered that contractors were not observing regulations requiring that workers have regular rest days. The tough decision was made to virtually close the site every Sunday. The rested workers were more productive, and there was no negative impact on progress.

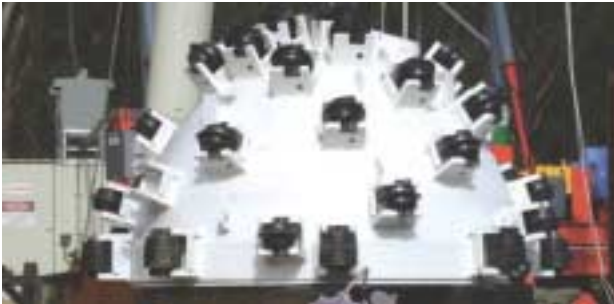
The safety initiatives developed on the Mozal expansion project are transferable to other projects and operations environments. The Hillside 3 aluminium smelter expansion project in Kwa-Zulu Natal, South Africa, began with Zero Harm as a major focus; and the safety team has made full use of the Mozal lessons. From the beginning, safety performance has been exceptional. At 30 June 2003, with over 6.6 million workhours, the CIFR at Hillside 3 was 1.83. The drive towards Zero Harm continues at all levels of the organisation.

The results achieved on the Mozal and Hillside expansion projects demonstrate that dramatic improvements in safety performance can be achieved without sacrificing other aspects of performance. New industry benchmarks in schedule and cost performance have been set. The key is an overriding commitment to the safety program and the goal of Zero Harm.

Construction of Dendrobium ventilation shaft sets new safety and environment standards



Our Dendrobium underground coal mine is under development at Mt Kembla in the Illawarra region of New South Wales, Australia. As part of the ventilation system for the mine, the No 1 ventilation shaft was constructed. The shaft, 183 metres deep and 4.25 metres in diameter, was completed without one person entering the shaft during the construction period. The project has set new industry standards in safety performance and environmental care.



► Drill head used in blind bore rotary drilling

From a safety point of view, the technologically advanced method chosen for construction of the ventilation shaft proved to be superior to traditional approaches. There was only one classified injury, which occurred when a contractor's employee cut his hand while installing meshing.

Environmental performance on the project was also exceptional. There were seven distinct phases. Recognising that the location of the ventilation shaft lies within an environmentally sensitive water catchment area, the Company worked closely with the Sydney Water Catchment Authority and the former Department of Land and Water Conservation to implement measures to minimise the environmental impact of the project.

In the initial phase, a level area surrounding the shaft and a sedimentation pond of approximately 1200 cubic metres were constructed. The level area was used to erect and operate the drill rig, and the sedimentation pond was used to provide return water and remove drill cuttings from the vent shaft.

A shaft pad and collar was constructed to stabilise the top eight metres of the shaft and to provide a base for the vent air fan duct elbow. The drill rig was then assembled on the pad. It consisted of a 450-tonne lifting capacity derrick, with a winch powered by two 160-kilowatt variable speed controlled electric motors. The drill head of the rig consisted of six 55-kilowatt motors driving into gear reducers combined onto a final drive gear.

The shaft was excavated using a blind bore rotary drilling method. This method employed an assembly of drill weights attached to the drill head to maintain drilling pressure on the cutting face. The shaft was drilled approximately three metres beyond the floor of the mine tunnel to allow rebound shotcrete from the shaft lining to deposit.

The shotcrete lining to the shaft was applied by a tele remote rig, consisting of a rotating three-arm machine. The shaft was progressively dewatered and shotcrete finished to a final thickness of 50 to 100 mm, depending on strata type.

Water control was critical during the project. A series of holes was drilled and pre-grouted around the shaft area, forming a grout curtain to minimise loss of water to the surrounding substrata as the shaft was kept full of water during the drilling phase. The curtain also minimised the ingress of water after the shaft was emptied, minimising entry of water into the mine and assisting the integrity of shaft lining.

It wasn't all plain sailing. In the course of lining the shaft, a heavy localised ingress of water occurred. This prevented shotcrete adhering to the shaft strata. To overcome this, an air drill was attached to the tele rig, lowered into the shaft and remotely operated with vision from rig cameras. Polyurethane resin grout was applied, and this stopped the water ingress.

Once the shaft was lined to 177 metres, the shaft lining was filmed using on-board cameras as the tele rig was withdrawn. The drill rig was then demobilised and the site rehabilitated before the mine vent fan was installed.

The contractors' adherence to the Dendrobium Environmental Management Plan and procedures further assisted in minimising the risk of an environmental incident.

The ventilation fan construction will act as a benchmark for the industry in terms of environmental and safety performance.

Building safety assurances into the construction and operation of a new drillship underpins an excellent safety performance in the Gulf of Mexico

In 1998, as the Company moved ahead with its oil and gas exploration efforts in the Gulf of Mexico, a project team began working with our selected drilling contractor on the construction of a new drillship designed for ultra-deepwater drilling. From the commencement of design, the goal was to achieve 'best in class' operational capabilities with outstanding safety performance. The CR Luigs spud its first well in April 2000 and has been employed on our operations for all but nine months since.



► The CR Luigs drillship at work in the Gulf of Mexico

The *CR Luigs* can operate in water depths up to 9000 feet, with a drilling capability of 35 000 feet. It carries a crew of around 130 and operates 24 hours a day. Under our agreement with the drilling contractor, we charter the rig with crew and associated services on a project-by-project basis.

The drilling operations can run from 30 days to 120 days, depending on the depth and complexity of the well. Some of the ultra-deepwater projects in the Gulf of Mexico have been in water depths close to 9000 feet, with drilling depths greater than 25 000 feet. They are among the deepest wells in the world.

To ensure the rig would meet our operational and safety requirements, we assembled a team of Company personnel and specialist consultants to work collaboratively with the drilling contractor during the design and construction of the *CR Luigs*. Our team included engineers with expertise in rig building, subsea drilling, and ship commissioning and maintenance, as well as health, safety and environment professionals. As construction progressed, they conducted detailed assessments of the drilling plant and vessel systems and also helped develop the rig's operating procedures and management systems.

Following the launch, a detailed safety management system audit was conducted. At that time, we also commenced a program of frequent visits to the rig by the project team, to address issues directly with rig management and the crews and to ensure effective lines of communication are maintained. Our senior management also visit the rig at least quarterly to re-emphasise the commitment of the Company to our health, safety, environment and community obligations.

Of the 130 or so crew on the *CR Luigs*, typically about 75 are employees of the drilling contractor, and the remainder work for the ten or more companies providing onboard services. Around three of our supervisors and superintendents will also be on board at any one time. A lot of work goes into creating a common safety culture on board, through a series of practical

and behavioural-based training programs. Progress is monitored and continuous improvements are implemented. As well, all crewmembers attend a weekly safety meeting to review incidents, conduct job safety analyses and discuss ideas for safety improvements. Drilling superintendents also schedule periodic themed audits of the safety systems to check how the systems are being implemented.

Because crew on a drillship are mostly working beneath suspended loads, the main safety hazard is dropped objects. We have developed a Dropped Object Prevention Program for the *CR Luigs* that is considered world's best practice. Initially, every item that could drop was catalogued and reviewed in terms of its purpose, necessity and ability to be secured. Unnecessary items were removed. For all the others, methods for securing them or catching them were developed, ranging from retaining pins to safety slings. A maintenance system was then developed, requiring that every item be frequently checked. Crewmembers participated throughout this process and now have a real sense of pride in the program and ownership of its implementation, a factor that has contributed significantly to its success.

With every well there is a bonus scheme based on safety performance. If the project is completed without an alternate duty injury (ADI), every crewmember receives a US\$150 debit card redeemable at a popular recreational goods store. The cards are also used as an incentive to participate in an Unsafe Acts and Conditions Reporting Program as part of the regular safety audits, which are conducted up to 20 times per month. Crewmembers submit suggestions for improving safety, and the best are rewarded with debit cards.

The need for rigorous attention to safety on drilling projects is underlined by an incident off Trinidad in 2001. An uncontrolled gas release resulted from a breach of policy following a malfunction. Thankfully no injuries or environmental harm occurred from the incident. As a learning experience, this near miss led to improvements in training and auditing that have since been incorporated in our standard operating procedures.

Well control and dynamic positioning procedures are part of the stringent safety systems and programs in place on the *CR Luigs*, which is recognised in the industry as a high-performing rig in terms of both efficiency and safety. With a reputation among crews as a 'happy rig', it is the rig of choice in the Gulf of Mexico.

Developing new coal technologies to meet the world's energy needs in a sustainable way



Meeting the growth needs of developing countries and sustaining living standards in developed countries will continue to drive fossil fuel energy demand, which is forecast to rise by more than two-thirds over the next 30 years. Suppliers of fossil fuels, including coal as the largest power generation source, face the challenge of meeting that demand while responding to concerns about greenhouse gas (GHG) emissions. The future path for coal must be to continue the development of low emissions technology.

An eight-fold increase in thermal efficiency over the last century has greatly reduced the amount of coal required per unit of electricity generated, and further significant improvements in efficiency are in prospect. Allied with ultra-low emissions techniques – notably coal gasification and CO₂ capture and storage (see accompanying diagram) – technology developments currently being researched have the potential to virtually eliminate GHG emissions from coal-based power. Projects are in place, or are proposed, to move the technologies towards commercial viability in the next decade or two.

As the world's largest coal exporter, we are playing a leading role in realising this potential through a range of activities aimed at raising awareness within the Company and the industry, providing credible and informed input to government policy, and making a major contribution to coal technology R&D. Our activities fall into the following broad areas.

Understanding and managing our own GHG emissions including:

- an emissions inventory system throughout the Group that meets evolving best practice GHG measurement standards and has a high level of external credibility
- coal-based emissions reduction projects, such as the Illawarra Coal Waste Mine Gas Utilisation project that avoids CO₂ emissions directly through the use of methane drained from our mines in on-site electricity generation and indirectly by displacing grid-based power
- investigating options for collaborative GHG reduction projects in South Africa, along the lines of the Kyoto Protocol's Clean Development Mechanism.

Industry leadership at a national and international level, such as:

- the World Coal Institute which, under the Company's chairmanship, established sustainability principles and goals for coal and facilitated regional dialogue between producers and utilities on the means of realising them
- our foundation role in the Australian Coal Association Sustainable Development Program, which is dedicated to a more informed debate on coal and sustainable development within and outside the industry in Australia.

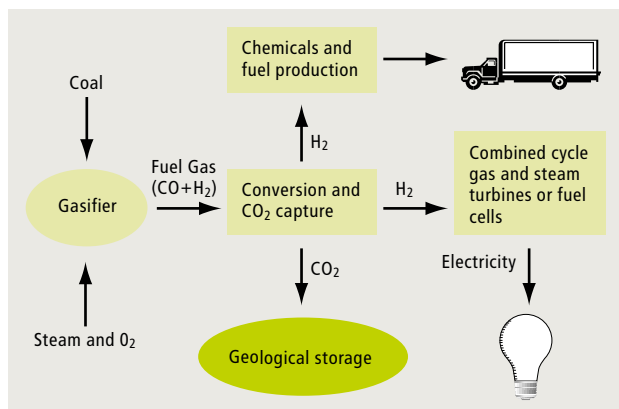
Direct participation in coal research and development, such as in Australia where we contribute about A\$3.5 million per annum to a range of programs, such as:

- the 'Coal in a Sustainable Society' research project that investigated technology-based opportunities for reductions in emissions on a 'whole of life cycle' basis
- the Australian Coal Association Research Program, which has a substantial coal utilisation component
- the Cooperative Research Centres on Coal in Sustainable Development and Greenhouse Gas Technologies – as joint initiatives among industry, government and research providers focused, respectively, on improved coal utilisation and CO₂ capture and storage

- the Australian Coal Association's 'COAL21' Project, aimed at providing a technology road map and action plans for future coal-based power generation in Australia, potentially including demonstration of an ultra-low emissions coal plant.

In addition, we have provided one of the two coal company representatives in the government and industry delegation to the Carbon Sequestration Leadership Forum. The 15-nation forum is aimed at coordinating research and development efforts to realise the technical and commercial feasibility of carbon capture and storage as a key low-emission technology.

Through these activities, the Company is helping to meet its commitment to reduce the GHG emissions intensity of its operations by 5 per cent by 2007 and contributing to long-term global efforts to ensure environmental sustainability in an energy-hungry world.



► Capture and storage of CO₂ from coal gasification

Greenhouse gas intensity reduction strategy is producing results



In 2002, BHP Billiton committed to reducing greenhouse gas (GHG) intensity (per unit of production) from operations by not less than 5 per cent between 2002 and 2007. A major contributor to the improvement has been our Aluminium CSG and, in particular, the aluminium smelters Hillside and Bayside in South Africa and Mozal in Mozambique.



► Potroom at Hillside smelter

Over the past year, members of the BHP Billiton Aluminium team took part in an initiative, led by the International Aluminium Institute (IAI), to develop protocols for measurement and management of GHGs in the aluminium industry. The IAI developed voluntary targets for the industry to apply to improvement efforts in GHG and other critical HSE performance areas. Our Aluminium CSG has fully supported the intent, workload and outcomes of the IAI initiative.

GHGs emitted from aluminium smelters are derived from various sources, including fuels used in parts of the smelting process and carbon anodes employed in smelting cells. GHGs in the form of perfluorocarbons (PFCs) are also emitted from smelting cells during process disturbances called anode effects (AE), which are measured in terms of frequency (AE per cell per day) and AE duration measured in minutes. In addition to the direct sources of GHG from the smelting process, emissions from the power industry are an indirect effect but can also be reduced, from the consumer perspective, by improving the power efficiency of the smelting process.

BHP Billiton Aluminium has focused on the reduction of GHG intensity across all the areas of operations and from all sources. As shown by the accompanying graph, emissions of PFCs at Bayside smelter are a major challenge in reducing GHG intensity; and therefore Bayside has been a principal focus.

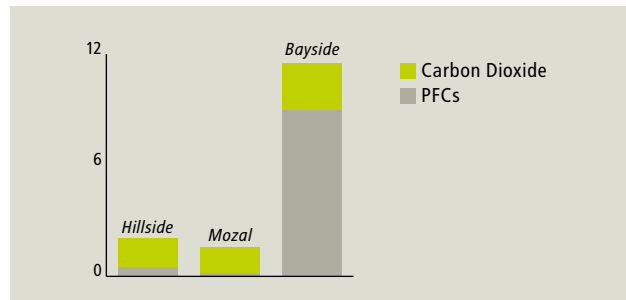
Improvements to existing technologies have included reduction of process instability through improved process control systems and work practices. At Bayside smelter, for example, improvements to these systems on the Søderberg cells in B and C lines have had a significant effect. As a result of the work completed to date, AE frequency has reduced from 2.6 to below 1.5 per cell per day, and AE duration has been improved by more than 15 per cent. A contributor to the improvements has been the fleet of new anode-effect quenching vehicles, which enable more rapid action to prevent or manage AEs as they occur.

At Hillside smelter, the introduction of slotted anode technology and improvements to the fuel efficiency in the baking furnaces through improved sealing have provided the basis for significant improvement by reducing fuel consumption and improving power efficiency. At Mozal smelter, slotted anodes and fuel burner optimisation in the anode-baking furnace have provided improvements. For the future, fuel substitution is a key strategy.

The Aluminium CSG sees improvement in GHG emissions as being part of a long-term plan, where emissions improvement and business improvement go hand in hand. In the implementation of new production capacity, GHG intensity is an important process criteria.

The reduction lines at Hillside and Mozal and new capacity being brought online, all benefit from world's best practice technologies.

Implementation of technology and management of ongoing operation practices provide the basis for improving performance. The training and development of personnel to operate these technologies to their capability have proved effective, achieving the outcomes to date.



► Contribution from each smelter to GHG emissions (tonne CO₂ equivalent/tonne Al)

Consultative process is addressing community concerns about mining beneath Appin township and Marhnyes Waterhole



The township of Appin is located near the upper Georges River in New South Wales, Australia. The Illawarra Coal operations undertake underground longwall mining some 500 metres below the surface. The mining can cause subsidence at the surface following extraction of the coal. Subsidence can cause cracking in the base of sandstone-bedded rivers and streams, redirecting water flow from the surface to the substrata. Mining has occurred beneath Appin and the Georges River, which has caused concerns to some local residents. These and other issues are being addressed through a comprehensive consultative process with key stakeholders.



► *Geologists at Marhnyes Waterhole, New South Wales*

Marhnyes Waterhole on the Georges River is of particular cultural and historic significance to the local Illawarra community. Concerns have been expressed by the community, government agencies and environmental groups about longwall mining beneath the waterhole.

A consultation program was initiated in 1998 and expanded in mid 2001. Meetings with more than 100 stakeholders were conducted, including local residents, community groups, government and environmental groups.

Those involved identified the need for stakeholder consultation and participation as a key concern. As a result, the Company developed a number of strategies to improve consultation and communication. A community office was opened in the Appin Village, providing a base for the Appin Area Community Working Group and for other community gatherings. Information about Illawarra Coal and the progress of longwall mining is provided at the office, which is staffed by Illawarra Coal representatives.

Regular newsletters and Community Information Sheets provide residents and other key stakeholders with up-to-date information regarding mining and other activities. The Company has also undertaken individual meetings with concerned residents and other stakeholders. A positive result of this consultation is that Property Subsidence Information Kits are prepared for all residents ahead of mining beneath their properties. The kits contain detailed information about the location of mining relative to their property, the expected impacts associated with cracking and any actions that may be required to address the cracking.

Mining beneath Marhnyes Waterhole was scheduled to be commenced by West Cliff mine in September 2002. The mining was planned several years in advance, and the longwall location could not have been modified without significant risk to the viability of West Cliff mine.

An innovative strain-relieving slot was drilled ahead of mining to reduce cracking of the rock bar that creates the waterhole. The slot, 29 metres long, 20 metres deep and 150 mm wide, was constructed adjacent to the river and was successful in limiting fracturing to the rock bar at the waterhole. However, some cracking did occur, with surface water redirected to the shallow substrata. Environmental flows of around 1.5 megalitres per day were provided to supplement the river during the period of mining effects and to provide water for aquatic life.

Now that mining beneath Marhnyes Waterhole is complete, remediation is being undertaken. This has included filling surface fractures, undertaken during November 2002, and grouting of the strain-relieving slot and riverbed to reinstate the integrity of the pools. The results of the remediation works to date have been encouraging. Paradoxically, the works have been hampered by rainfall, resulting in high water levels during the first half of this year. The works will continue once the water levels have receded.

Positive feedback has been received from stakeholders, indicating that the community consultation program has been effective and appreciated by participants. It has helped to build constructive relationships across government, community and environmental groups. The consultative strategies are resulting in the stakeholders having improved confidence in the Company's ability to address issues of concern.

However, some issues and concerns remain. Proposed mining areas intersect rivers and creeks across the Illawarra region, and stakeholders have expressed a desire for more input into the mine planning processes. People in the community have also raised concerns about impacts to homes and property from cracking. As a result of the concerns raised, Illawarra Coal is reviewing its mine planning to include a more rigorous assessment of surface features and to better communicate with key stakeholders during the planning process. The Company will continue to work closely with government agencies and community and environmental groups to address issues and concerns relating to mining in the area, within the context of sustainable mining plans.

Rehabilitation program at Beenup is restoring the mine site as a self-sustaining environment of native vegetation, wetlands and pasture

Our Beenup titanium minerals mine in south-west Western Australia closed in 1999. To restore the land that had been disturbed, a rehabilitation plan was developed in consultation with the government and the local Augusta-Margaret River community. Restoration works under way include retention of the dredge pond as a permanent water body, the creation of seasonal wetlands, recontouring of the site and an extensive revegetation program. The overall aim is to create an environment that supports a functioning, self-sustaining ecosystem.



► Beenup rehabilitation program manager Jocelyn Bird checks revegetation progress at the site



► Declared Rare Flora, *Grevillea brachystylis* ssp. *australis*, is establishing significant populations at Beenup

The Augusta-Margaret River region has many natural attributes that have given rise to strong environmental sentiment in the community. The Beenup site, located just 17 kilometres from the town of Augusta, lies near the confluence of two rivers, the Scott and the Blackwood, and adjacent to the Scott National Park. Both rivers are relatively pristine and support a high biological diversity, aquatic recreation activities and professional fishing. Nearby residential communities have been developed with environmental values in mind.

With the high degree of local interest in the restoration of the mine site, the community, through the Beenup Consultative Group (BCG), was invited to be involved in developing the Rehabilitation Plan. The BCG has been active since 1989, prior to construction of the mine. Its membership comprises representatives from the Shire Council, all sectors of the local community and BHP Billiton.

The area to be rehabilitated included 336 hectares of disturbed land, a 50-hectare dredge pond, a large storage area containing material that had been excavated from the pond and two ponds for storing clay fines.

Several options for rehabilitation were submitted to government, the Shire Council and the BCG for consideration. As well as the need to preserve the quality of the local river systems, a key environmental issue was the management of pyrite, a naturally occurring sulphide mineral that, if exposed to the air, has the potential to oxidise and form acid. A primary objective of the rehabilitation was to neutralise any disturbed acid soils and ensure all pyrite remained saturated to prevent exposure to the air.

Following extensive public consultation, implementation of the approved plan commenced in late 1999. The rehabilitated site will comprise around 80 per cent native vegetation and wetlands and around 20 per cent pasture. The plan has allowed the clay fines to be retained in the former dredge pond, which has been established as a permanent water body. More than 2.5 million

tonnes of sand have been shifted from stockpiles and elsewhere and redistributed around the site, particularly for recontouring the pond.

Seasonal wetlands have been developed, which encourage the creation of diverse flora and fauna habitat and support functioning ecosystems. The pond and wetlands, together with the extensive use of lime sand, also facilitate long-term management of the pyrite.

A major component of the project has been the reinstatement of surface water drainage across the site. The recontouring of the pond and development of the wetlands have been designed to both facilitate and manage drainage. Meandering spillways link the wetlands, directing the surface water so the main outflow is to the Blackwood River. Additionally, the spillways are designed to control the water level to help minimise flooding and erosion. The wetlands and spillways are also arranged so the surface water passes through as many planted reeds and rushes as possible, enhancing bio-filtration.

The extensive revegetation program involves the propagation and planting or broadcasting of over 110 million native seeds, representing over 110 plant species. At least four declared rare flora species are being established on the site. The project is providing the general botanical community with significant data on innovative germination and propagation methodologies.

As rehabilitation nears completion, the Beenup site is taking shape as a self-sustaining botanical precinct with potential for flora and fauna research, environmental education and eco-tourism.

'Revive our Wetlands' program aims to protect and revitalise 100 of Australia's most important wetlands



'Revive our Wetlands' is a major environmental initiative implemented by the Company in partnership with Conservation Volunteers Australia (CVA) to address the ongoing loss of vital wetlands throughout the nation. Utilising CVA's expertise in attracting and managing large groups of volunteers, the initial three-year phase of the program has provided practical assistance, resources and training to communities around the selected wetlands. A team of trained wetlands officers employed by the program facilitates support to local conservation groups, parks and wildlife services, schools and private landholders.



► CVA provides resources, skills and guidance to assist local communities to protect selected wetlands



► Through the program, volunteers are engaged to help at 'Revive' sites around Australia

The program's origins date back to 2000, when the Company and CVA began researching environment issues of mutual interest and critical need. CVA is Australia's largest not-for-profit conservation organisation and a leader in attracting and managing a force of volunteers in practical projects.

We jointly wanted to develop a partnership program through which we could exchange skills, knowledge and resources and achieve a positive and measurable impact within three years.

Wetlands are among the most important life support systems on earth and are vital for ecological sustainability, yet it is estimated that more than half of Australia's wetlands have been destroyed since European settlement. Developing a program to help reverse this loss was identified by CVA as a worthwhile initiative and one of mutual interest. Water management is an important aspect of all BHP Billiton businesses, and many of our mines are in close proximity to wetlands that must be conserved. Post closure, our mine sites are often rehabilitated as wetlands.

The wetlands targeted in the 'Revive' program include coastal wetlands, river systems, lakes, watercourses, alpine marshes and floodplains. The aim was to implement a rehabilitation program in line with the strategies set out in the Federal Government's Wetland Policy and Implementation Plan.

A partnership team comprising representatives of the Company and CVA was formed to manage the program. A pilot project was then trialled in Queensland at the Townsville Town Common, a renowned conservation park and habitat for migratory birds, which had become severely degraded. A project aimed at achieving ongoing sustainability and management of the site produced encouraging results, and the 'Revive' program moved into the implementation phase.

During the 12 months of planning and developing the program, the 100 wetlands sites were selected through liaison with local land groups, environment agencies, councils, state governments and wetlands consultants. A national coordinator was appointed to the program, along with nine wetlands officers located

around Australia. A public awareness campaign was conducted; and thousands of volunteers were engaged, including students, families, retirees, other interested community members and BHP Billiton employees.

A communications system has been established, including an interactive website, a regular newsletter and an annual progress report to key stakeholders, including government bodies, environmental NGOs and community groups. An international wetlands expert has been appointed to monitor the program and report against environmental outcomes on an annual basis.

In restoring the 100 wetlands, to date more than 15 000 volunteer days have been provided, 30 000 plants propagated, nearly 160 000 native seedlings planted, 650 hectares of weeds removed, 45 kilometres of new fences erected, 300 kilograms of carp removed, hundreds of bags of rubbish removed, 30 kilometres of walking tracks maintained and 8 kilometres of new tracks constructed. More than 500 BHP Billiton employees and their families have volunteered at 'Revive' sites.

Additional funds for the program have been gained through new funding commitments from the Federal Government and state governments and other corporate sponsors.

'Revive our Wetlands' received the Prime Minister's Business and Community Partnership Award (large business category) in December 2002. In the *Australian Financial Review Magazine* Corporate Partnership Awards announced in July 2003, the program was winner of the Science, Environment, Health and Education Category and also named Corporate Partnership of the Year.

Significantly, 'Revive our Wetlands' is being managed on the basis of it becoming a sustainable program, with local communities being provided with the resources and practical skills to continue wetlands protection and conservation into the future. As many as 30 per cent of the 'Revive' projects are already operating without CVA assistance. The Company and CVA are planning to extend the program for a further three years.

Waste management program at Cerro Matoso delivers environmental benefits and more



At our Cerro Matoso ferronickel smelter in the province of Cordoba, Colombia, solid residue is generated during the production process. Added to this is general waste produced in the course of operating the plant. To manage this waste, a project team at the plant has developed and implemented a waste handling and use program to encourage minimisation, facilitate recycling and ensure environmentally responsible disposal of unusable residue. The program has succeeded in raising environmental awareness among employees, contractors and visitors; adapting existing logistics and infrastructure to appropriately handle the waste; and delivering benefits to the local Montelibano community.



► Solid waste disposal site at Montelibano

Key components of the program, which was developed over two years with the assistance of the environmental team, were to design and implement an environmental awareness strategy, establish and put into effect the project logistics, and provide support to the community-based company responsible for the handling and use of waste materials.

The environmental awareness strategy centred on developing behavioural change among employees, contractors and also visitors, so that waste is appropriately classified at the point where it is generated. The strategy extended to encouraging the personnel handling the waste products to process the greatest volume of waste appropriately in order to obtain the greatest economic benefit.

With the program in place, 100 tonnes of scrap is recycled each month, along with 10 tonnes of waste (cardboard, paper, glass, plastic, metal). Up to 14 tonnes of organic waste is transformed into compost and 22 tonnes into pig feed each month. The profits from the utilisation of this recycled waste go to the San Isidro Foundation, which allocates the funds to community projects.

An additional social benefit is that the extra work undertaken by the company handling the waste provides around 40 jobs each month in Montelibano.

Environmentally, waste volumes are minimised; and unusable waste is disposed of in such a way that there is no contamination of ground surfaces, underground water or the air. One of the initiatives in place is the use of covered evaporation cells to remove leachate from the sanitary landfill waste.

The project is a good example of how to involve the community in a program to responsibly manage waste while generating environmental and social benefits – and contributing to meeting the goal of sustainable development.

Yabulu refinery maintains an environmental assessment and management program to preserve local ecosystems

The QNI Yabulu nickel refinery at Halifax Bay in north Queensland, Australia, is situated on 2500 hectares of land that includes areas of conservation significance. Since operations commenced in 1974, environmental monitoring has occurred at the refinery. In 1997, the monitoring strategy was expanded, and the Environmental Assessment and Management (EA&M) program was established. This program includes actions to protect coastal wetlands and the adjacent Great Barrier Reef Marine Park.



► Yabulu refinery wetlands are maintained as a wildlife habitat and serve as a haven for many birdlife species

The EA&M program classified the refinery site into three management zones – buffer, infrastructure and industrial – based on their environmental values and proposed land uses. The objectives of the EA&M program are to:

- establish a model for the various ecosystems within the buffer zone
- monitor environmental conditions within the buffer zone and adjacent marine ecosystems
- establish key environmental 'health' indicators
- assess the health of the various ecosystems
- recommend remedial actions where required
- develop a scientifically defensible environmental monitoring data set.

The initial scope for the EA&M program was four years, and this period was concluded after completion of the 2001 monitoring season. Having proved to be a valuable management tool, the program was adopted by the refinery as part of its routine environment plan.

The monitoring program covers the marine zone, buffer zone, aquatic ecosystems and buffer zone terrestrial ecosystems.

Within the program there is a broad range of monitoring sub-programs and methods, reflecting the need to understand the key drivers of the various ecosystems and the range of ecosystems present.

Each year, the results from the EA&M program are compiled into a summary report supported by extensive appendices containing the monitoring data. This report is used to set annual environmental programs, as well as long-term objectives, within the context of the refinery's business plans.

Results of the studies show the refinery's long-term land management strategy has protected many ecosystems that would otherwise have been lost if the land had been cleared for residential development. The studies confirm that current environmental management activities and programs are effective in preserving valuable local ecology.



The buffer zone supports many species of plants and animals, with a diversity and richness comparable to other undisturbed lands along the north Queensland coast. The assessment of the zone shows that all key indicator species for each ecosystem are present and, importantly, each ecosystem is stable. Several distinct ecosystems have been identified, including sand dunes, mangroves and salt flats, open forest, and eucalypt and melaleuca woodlands. The broad variety of identified fauna includes endangered migratory birds that use the buffer zone for breeding.

The EA&M program is a Company initiative and does not form part of the statutory controls applied by the Queensland Environmental Protection Agency (EPA). Reflecting its open relationship with the EPA, the refinery provides the Agency with an annual briefing on the data from the program.

The program's detailed database has also proved useful for other purposes, such as the work undertaken by the refinery with local and state government organisations on regional initiatives to address risks posed by fire, weeds and feral animals.

The annual monitoring and assessment component of the EA&M program is conducted on behalf of the Company by Central Queensland University's Centre for Land and Water Resources Management. In turn, the Centre utilises resources of James Cook University and the University of Queensland.

Energy Smart Program exceeds target at EKATI Diamond Mine

Current Savings (Litres)

1,012,031L (June 18, 2003)
TARGET 1,000,000L
941,357L (May 2003)
865,638L (Mar 2003)
770,828L (Feb 2003)
690,000L (Dec 2002)
503,000L (Oct 2002)
210,000L (Aug 2002)
104,872L (Jun 2002)



Our EKATI Diamond Mine is located at Lac de Gras, 300 kilometres north-east of Yellowknife and 200 kilometres south of the Arctic Circle, in Canada's Northwest Territories. In April 2002, a team of highly motivated volunteers from a variety of departments at the mine formed an Operating Excellence Team on Energy Conservation. They set about tackling the inefficient use of energy at the site. Aiming at saving the equivalent of 500 000 litres of diesel fuel per year, they had reached their goal by October. Not content with their success, the team raised their target to 1 000 000 litres – and achieved it. They call their initiative the Energy Smart Program.



► The Energy Smart Program at EKATI has reduced the requirement for fuel haulage to the mine

The Operating Excellence Team established that, for every kilowatt hour of power used, 0.25 litres of fuel were consumed in the power house. The goal of 1 000 000 litres of fuel is equivalent to about 12 per cent of the mine's annual power generation consumption.

Taking a strategic approach to their Energy Smart Program, the team tackles the problem on a variety of fronts, including:

- easy wins – such as installing motion sensors on lights and thermostats on heaters
- big savings/more work – modifying power house radiator fans and reusing waste oil
- staff education – conducting Energy Smart presentations to crews
- tax incentives – gaining potential tax savings by reducing use of fossil fuels
- promotion – producing posters and stickers and awarding prizes for ideas
- new projects – incorporating Energy Smart ideas into building designs.

As part of the plan to build an energy-saving culture at the mine, the team invites fellow employees, who number around 700, to contribute ideas. The response has been overwhelming (more than 260 suggestions were received in the first six months). A key factor in the success of the suggestion scheme has been that employees who participate are recognised and rewarded with prizes, such as caps and golf shirts.

The suggestions are reviewed and categorised according to a 'pay-off' matrix – the ideas that can provide the biggest return for the least amount of work are implemented first.

Since the Energy Smart Program commenced, initiatives have included:

- installing motion sensors on lights in offices, laundries, lunchrooms and washrooms
- installing thermostat controls to regulate individual room temperatures during unoccupied times
- interlocking heat trace systems so they only become active when water flow stops
- installing dual-flush toilets in washrooms to reduce water consumption
- changing controls to slow down or shut off ventilation systems in areas that are unoccupied at nights
- shutting off fan motors, welders and pumps when they are not required
- installing timers on the electric heaters used on light vehicle engine blocks in the cold months.

The team is also working on a range of other energy-saving projects. For example, there is a surplus of waste oil, which is collected after oil changes on the large mobile fleet. The mine has had to truck the waste oil off-site and pay for its disposal. The conventional diesel-driven furnaces are now being replaced with waste oil furnaces. This will save fuel and do away with the need to transport the waste oil off-site.

Fuel is also consumed to burn garbage on site in six incinerators. The incinerator design is being re-engineered to also use waste oil as a combustion source. This innovative idea has the potential to save over 400 000 litres of fuel per year.

Another idea being investigated is putting controls on the air compressors that feed the underground operations. The controls will shut off the compressors between shifts when they are not required.

The team is also extending the Energy Smart Program to new projects. Energy-saving ideas from the program are forwarded to the engineering groups for consideration, so buildings can be designed to be energy efficient from the start. For example, a new underground office complex is totally heated with waste oil; and an extension to the site camp includes water-saving ideas, such as dual-flush toilets and low-flow showerheads.

With enthusiasm for the program still very much alive and a 'think Energy Smart' culture increasingly evident, the Operating Excellence Team at EKATI is confident the achievement of saving 1 000 000 litres of fuel per annum can be maintained.

Ingwe develops innovative solution to stormwater run-off during mine site rehabilitation

When one of our Ingwe coal mines in South Africa ceases production, the Mine Closure Operations (MCO) team is responsible for rehabilitation of the mine site. A major issue during rehabilitation can be the drainage of stormwater run-off from discard dumps. Conventional concrete drainage structures are not environmentally friendly and, at times of high rainfall, can be easily damaged. As an alternative, the MCO team has developed the concept of spiral contour drains. This solution is not only environmentally more responsible but also costs less and is less subject to failure.



► Spiral contour drain at South Witbank

With conventional stormwater drainage on a discard dump, the water is collected in chutes that direct it down a steep slope to the bottom of the dump. The chutes are typically constructed from concrete materials. As it rushes towards the bottom of the dump, the water can reach high velocities and sometimes gain sufficient energy to seriously damage the chute. At the bottom of the dump, specialised structures are required to dissipate the energy of the water to prevent excessive soil erosion.

There are other problems associated with this type of drainage. The concrete structures are costly to erect. As well as being subject to damage from the rushing water, they can fail due to differential sagging of the coal discard material. They are difficult and costly to remove once the dump is rehabilitated; and, if they remain on-site, they can impede access to the area.

Realising the need for a different approach, the MCO team developed a solution based on the spiral contour principle. The contour drain starts at the top of the dump and winds downwards in a gently spiralling manner until it reaches ground level, where the water is dissipated into the natural watercourse. The use of concrete structures is minimised and sometimes eliminated.

There are numerous benefits. The final product is more environmentally responsible due to the minimal use or absence of concrete structures. The cost is substantially lower, the risk of failure is vastly reduced, and all areas of the dump are accessible from between the spiralling contours.

The first spiral contour drain was constructed at South Witbank Colliery on a small discard dump covering approximately 5 hectares. The drain spirals down to the bottom of the dump, where the remaining energy of the water is dissipated in a delta-shaped outlet.

The second spiral contour drain was also built at South Witbank on a dump covering 8 hectares. This time a double spiral contour was installed, the first draining clockwise and the second anti-clockwise.



The double spiral contour system was also applied on the 65-hectare Ermelo Mines Services, but with both contours draining anti-clockwise. In this case, because of the steepness of the topography and the huge volume of water to be drained in the event of a heavy rainstorm, some concrete blocks are used to reinforce the outlets at the bottom of the dump.

The latest mine site where the principle has been implemented is Transvaal Navigation Collieries. Building on experience gained at the other sites, the aim was to install the minimum amount of contours to enhance accessibility. Farm machinery can operate more effectively, allowing for easier management of vegetation until closure of the mine. This facilitates future conversion to grazing on a sustainable level.

Because of the varying topography of this site, the drain outlets that dissipate the energy of the water were designed with different methods. On one side, which is very steep, the drain discharges at ground level into a concrete structure. On the less sheer side, two contours drain into a delta, so the energy of the water is released over a wide area and into the natural watercourse. Provided the topography allows for it, the ideal is to dissipate the water into such a delta-shaped outlet, as it costs less and is more environmentally responsible.

Based on these projects, spiral contour drainage has been shown to be a successful system for draining run-off stormwater drainage from discard dumps; and the MCO team has adopted the principle in preference to conventional drainage structures.

Trials show grazing can be a sustainable use of rehabilitated mine land in Australia's Bowen Basin



When mining commenced at five of the open-cut coal mines we manage in the Bowen Basin of central Queensland, Australia, the legal requirement was that, after mining, the land was to be returned 'to purposes connected with grazing'. The rehabilitation of these mines has focused on the establishment of pastures that could be used for grazing once mining had finished. To test the sustainability of grazing as a post-mining land use, trials have been conducted for several years at our Blackwater, Norwich Park and Goonyella mines, with positive results.



► Test grazing on rehabilitated area at Norwich Park mine

At Goonyella mine, the cell grazing management method was applied with reasonable liveweight gain, despite the drought conditions that prevailed during the season. A selected group of cattle from the herd have also free-grazed on about 80 hectares of rehabilitation pasture with good liveweight gains.

These trials and the extension of grazing to other areas of rehabilitation on the mine indicate that, with appropriate grazing management, mine lands can be used for cattle grazing.

Establishment of pastures on post-mining landforms in this region not only provides opportunities for productive land use, but also has a significant benefit in minimising erosion.

However, in recent years, the sustainability of grazing as a post-mining land use in central Queensland has been questioned. Without sound management, non-mined lands in the semi-arid regions of Australia have exhibited significant degradation as a result of grazing.

To test the sustainability of grazing as a post-mining land use, grazing trials have been conducted for several years at our Blackwater, Norwich Park and Goonyella mines. These trials have demonstrated that grazing can be sustained on mined lands at stocking rates comparable to those in the region. Similar results have been achieved using the two different management regimes commonly applied in grazing management.

The trials included assessment of cattle liveweight gain, pasture condition and soil erosion at various stocking rates. The primary aim of the trials was to determine the long-term stocking rate for mine rehabilitation pastures.

Grazing at three stocking rates at Blackwater mine yielded good liveweight gains, better gains than on non-mine pasture nearby in the same season. This led to requests from several neighbours for agistment of cattle in other parts of the mine. At the highest of the stocking rates, the grazing pressure was heavier than desirable as the erosion rates measured after grazing were unacceptable. Cattle are now grazing at about the district average stocking rate on 72 hectares of rehabilitation pasture at the mine.

At Norwich Park mine, cattle are grazing on test areas in a second phase of the trial. The stocking rates applied in the first phase had little impact on the pasture condition, even at the higher stocking rate, even though this was close to the district average. Liveweight gains exceeded those from the adjoining unmined land in the same season. Cattle are now grazing on more than 270 hectares of rehabilitated mine land at the mine.

Minerva development project applies an integrated approach to managing environment and community issues



The Minerva gas field is located approximately 10 kilometres offshore from Port Campbell in the Otway Basin of Victoria, Australia. Our development project management team understands the importance of a proactive approach to managing environment and community issues. They recognise that the community and other stakeholders have a diverse range of perspectives and inputs to offer that can prove valuable in the successful execution of the project. The Environmental Review Committee (ERC) is a formal communication mechanism that has been put in place to involve the project's key stakeholders, allowing them to review each phase of the project, including its planning, construction and operation.



► Members of the Environmental Review Committee with coordinator Kirsty Couper (r) of BHP Billiton at Port Campbell

The Minerva development project is scheduled for completion in 2004. Untreated gas from two wells will be transported via an undersea pipeline that crosses the shore at Two Mile Bay, traversing through a horizontally drilled hole under the Port Campbell National Park and continuing underground to a gas treatment plant located approximately 4.5 kilometres inland.

Key issues and concerns raised by the community during the Environmental Impact Assessment (EIA) process included the visual impact of offshore and onshore facilities; impact from shore crossing of pipelines; effects of air, water, noise or odour emissions from the plant; the impact of condensate trucking operations on local traffic; issues relating to Aboriginal sites and Native Title; the importance of protecting the iconic coastline and tourist routes; and the need to maintain the integrity of the Port Campbell National Park. These issues have been substantially addressed by such project decisions as careful selection of the plant site, design modifications, early landscaping of the site and seasonal restrictions on construction activities.

The ministerial approval conditions, together with recommendations made by a ministerially appointed review panel and the Company's own voluntary commitments during the EIA, resulted in a considerable list of commitments to be adhered to by the development. These commitments have been collated in the form of a register – The EIS/EES Commitments Register – that forms the basis of the commitments implementation strategy.

The ERC was established following the state and federal ministerial assessments of the EIA process. The Committee has prepared a formal charter that ensures its activities are conducted in an ordered and constructive manner. Operating as an active working group, it provides an opportunity for community members to understand the operations by being regularly informed on project activities and is the primary

mechanism for the community to express concerns about issues related to the development. Members of the Committee are consulted on the design of monitoring programs, and they review results of monitoring in accordance with the consultative process recommended within the ministerial assessment.

Chaired by an independent chairperson who is an elected member of the local Corangamite Shire Council, the Committee's wide range of stakeholders includes representatives from federal and state government authorities, shire representatives, the local school, environment groups, the local Aboriginal community, neighbours, and representatives from the Company and the project.

The recommended level of consultation for the project has been exceeded and involves ERC members as full auditors in environmental audits carried out on the project. To ensure that their participation in audits is effective, ERC members nominated to represent the group in environmental audits have received formal auditor training, which has provided community members with additional skills.

As at June 2003, three audits involving trained representatives from the ERC had been conducted; and the results have been subsequently presented to ERC meetings by the audit representatives. These audits have checked conformance with the requirements of the Environmental Management Plan modules for offshore drilling and subsea installation of the gas production wells, for the horizontal directional drilling shore crossing, and for the onshore flow-line.

With the ERC in place as the main forum for community consultation, a number of community projects are also being undertaken, consistent with the BHP Billiton Community Programs Guidelines. As well as sponsorship of local projects that benefit the widest possible range of community sectors, initiatives include the provision of job training opportunities to students of the local school and career orientation seminars given to local school students by BHP Billiton professional staff.

Acquisition of Tabaco village in Colombia provides lessons for future resettlement projects



BHP Billiton and its joint venture partners, Anglo American and Glencore, became equal owners of the Cerrejon Zona Norte (CZN) coal mine in Colombia in February 2002, when they acquired International Colombia Resources Corporation (Intercor) from ExxonMobil, which held the mine's remaining 50 per cent ownership and operational interests. A new company, Cerrejon Coal Company, was formed, combining CZN and Carbones del Cerrejon. Situated within the mining lease is the village of Tabaco.

In 1997, prior to the involvement of BHP Billiton, the acquisition of Tabaco commenced to enable future expansion of the mine's operations.

The acquisition has proceeded in accordance with Colombian law. As part of the legal process, a survey was conducted to determine whether the people of the village wanted to sell their possession rights or be relocated. The survey established that there were 213 possession rights in Tabaco, of which eight were municipal public properties, 151 were unoccupied lands or houses and 54 were occupied dwellings.

In the survey, 95 per cent of the possessors said they did not want resettlement and wanted to negotiate directly. Subsequently, 192 out of 213 possession rights were settled; and acquisition of the eight public properties was negotiated with the municipality of Hatonuevo. In August 2001, the remaining 13 possession rights were acquired through an expropriation process ordered by national judges in accordance with the Mining Law.

Court action was initiated on behalf of those people who had not agreed to sell their possession rights; and, in May 2002, the Colombian Supreme Court ordered that the municipality of Hatonuevo provide primary education and housing infrastructure support for children of this group. While schooling is provided free to students, there are associated expenses for such items as educational materials.

Some months earlier, Cerrejon had approached the municipality and offered to assist with the education of these children. An assistance program was implemented; and, during 2002, Cerrejon helped meet the schooling expenses of 21 children of former Tabaco residents. Eight of the children were attending school in Hatonuevo and nine in Patilla. The other four children had moved with their families to Barranquilla, and they were granted one-year scholarships.

Following a review at the end of 2002, it was decided the funding should be provided directly to the schools attended by the children. Through the Fundación Nuestra Señora del Pilar, assistance has been given to the school in Hatonuevo for a cafeteria and to the school in Patilla for school furniture and materials. As the four children living in Barranquilla could not continue their studies without individual support, their scholarships have been extended for another year.

In May 2003, Cerrejon offered the municipality of Hatonuevo some land for community use; and it has been indicated by the municipality that this may also benefit the affected people from Tabaco.

The Cerrejon management team has reviewed the processes that it follows when the relocation of a community becomes necessary, so as to ensure that they are consistent with international best practice and are focused on the maintenance of sustainable livelihoods. To this end, Cerrejon will adopt relevant World Bank guidelines for any future resettlements.

The Company has also adopted the US-UK Voluntary Principles on Security and Human Rights to guide interactions between the Company's security providers and local communities. Cerrejon's approach is consistent with BHP Billiton's group-wide commitments.

Pakistan community program focuses on education to improve quality of life



Our Zamzama gas project in Pakistan is located in the district of Dadu, which lies approximately 500 kilometres north of the coastal city of Karachi in Sindh Province. The area suffers from very low rainfall, lacks basic infrastructure and has limited educational facilities or opportunities. Our community development program is aiming to facilitate the empowerment process and improve the quality of life for the poor and the vulnerable people living in the areas where we operate. Education is considered to be a vital part of this process.

Prior to developing the program, consultative workshops were organised to ensure effective community participation and ownership of the project and to assess the critical needs in the area. These consultations revealed that access to quality education was the primary concern, with girls and women having been particularly disadvantaged.

Further research in Dadu showed that there were clear opportunities to improve school infrastructure; enhance teaching methodologies; and increase the motivation of teachers, children and parents towards education.

As part of its program, the Zamzama community development team has implemented a two-phase project. Initially, two local NGOs (Child Development Organization and Village Shadabad Welfare Organization) were selected to develop an education program. This then led to the establishment of five primary schools in the Johi area of Dadu. With support from the Company, the schools have been provided with appropriate infrastructure, furniture and equipment, and trained teachers.

The project has included a number of key components:

Capacity building – The aim has been to enhance the skills and knowledge of the local NGOs and schoolteachers through training, to ensure effective project management and improvement in the quality of education. Raising awareness of basic human rights and building confidence in the local community were integral parts of the project.

Livelihood opportunities – The project has provided income for the local NGOs, schoolteachers and vendors by ensuring that employment opportunities have been filled by people from the area.

Participation and partnership – Regular multi-stakeholder consultations and meetings have been convened before and during the execution of the project. In particular, community forums have been developed with an emphasis on encouraging the local community, especially women, to take part in the decision-making process.

Broad stakeholder involvement has been part and parcel of the development of the project. Regular consultations with the government, civic organisations and the community have taken place throughout the project phases. The local NGOs have overseen the smooth implementation of the project, while the community donated the school buildings. The government has further contributed by registering the local schools as part of the formal education framework and taking responsibility for routine monitoring of the schools.

While critical to the success of the project, the imperative to involve the community and other stakeholders has also provided a number of challenges. For instance, although the community development team has a set of criteria to select NGOs to engage in partnership, having as many as seven submitting proposals made for a complex process. Then, during the collaboration process with the selected NGOs and all the stakeholder groups, it was a matter of overcoming diverse interests and agendas in order to gain consensus.

A further challenge was to create awareness in the community that the people need to manage their own development and, importantly, to mobilise them into actively taking responsibility. Part of this involved bringing about an attitudinal change in order to allow the young local girls to have an opportunity to attend school. The aim was to achieve change while respecting and working within the cultural norms and traditions of the area. These efforts have been worthwhile, and the benefits are now being realised. The project has provided education opportunities for the children, especially girls. Through interactive learning, the children are learning about issues related to literacy, health, hygiene and basic human rights.

The schoolteachers have benefited from their training and feel confident in their abilities to teach the children. They realise their roles and responsibilities and are actively involved in the decision-making process. Through their jobs, the women teachers have gained economic independence and can adequately support their families.

The parents too have been empowered. By involving the parents, especially the mothers, in the management of school issues, they now feel more confident about making an effective contribution to the decision-making process in matters affecting their lives.

The involvement of the parents, other members of the community, the government and NGOs is seen as a prerequisite to achieving sustainability of the project by instilling a sense of ownership and the motivation to take responsibility for maintaining the education program.

Key achievements

Schools operational	5
Teachers employed and trained	13
Children enrolled	477
Villages benefiting from the schools	60
Partner NGOs engaged	2
Community-based organisations formed	5
School management committees formed	5
People directly involved in the project	23

Corporate Community Leadership Program examines impact of community development activities in India



The Corporate Community Leadership Program is a joint learning initiative developed by the Company and Oxfam Community Aid Abroad (Oxfam CAA). This is the second year of the program, which aims to expose participants to the impact that community development projects can have on the livelihoods, living standards, health and rights of local communities. This year, 12 of our employees, accompanied by four Oxfam CAA facilitators, journeyed to India for two weeks, visiting villages in the eastern state of Orissa.



► Women of Chikilmari village, Orissa



► CCLP participant Alana Birchall with women of Chikilmari village

The Company participants in the program represented a diverse range of BHP Billiton businesses, locations and roles, from people involved in hands-on community affairs to senior management.

Following a comprehensive briefing in Vizag, the group travelled to Orissa for a series of village visits organised by WIDA, a local NGO whose acronym derives from Integrated Rural Development of Weaker Sections in India.

WIDA's focus is on empowering village communities by establishing community organisations and facilitating capacity-building projects. Much of their work is directed at forming committees of people within a village and then within a federation of villages. This is aimed at giving people the opportunity to have their opinions heard.

As well as seeing successful community development programs in practice, participants also saw close-up how communities can be negatively impacted by infrastructure development, especially when it involves displacing and relocating people. The group visited villages that have not participated in any community development work, as well as villages where WIDA has been active for many years. The difference between them was stark.

In the village of Putsil, for instance, a micro hydro plant had been built by the villagers with the assistance of WIDA and several overseas NGOs. The plant provides the village with a few hours of electricity a day, which is used for lighting and to run an oil pressing plant and a grain grinding mill. This frees the women from the long hours of work involved in grinding grain by hand and also gives them a means to earn money by grinding grain for other villages.

This is a good example of how WIDA helps people to develop income-generating enterprises through small-scale projects. Other examples are handicrafts and new activities, such as building dams to farm fish. Women are also being trained in non-customary roles, such as masonry and carpentry.

The group then travelled to Berampur where they were hosted by Gram Vikas, one of India's largest NGOs. Gram Vikas takes a different community development approach to that of WIDA, focusing on large-scale community infrastructure projects. They work with villagers to install water plants and sanitation systems and to develop basic education and healthcare programs.

A key learning from the Corporate Community Leadership Program is that leading-edge community development work is based on human rights. This means going beyond providing services and physical infrastructure and focusing on helping people through building social capital and organisational capacity.

This aspect of the program highlights the complexities of the Company's community development involvement. On returning from India, one of the participants noted that 'One of the things I hadn't anticipated is what a political process community development is. The aim of a rights-based approach to community development is to empower people; and, as a consequence, you can end up with politicised communities because they are fully aware of their rights and they demand them. Doing the right thing is not necessarily going to be comfortable for us. But, after all, it is the communities who will decide when the Company is successful at community development'.

This comment is a reflection of our recognition that local communities are key stakeholders in the resource development process and that we have a responsibility to acknowledge and respect their rights. Through our involvement in the Corporate Community Leadership Program, we aim to further our understanding of social issues related to our operations, so that we can continue to improve our skills in planning and implementing effective and sustainable community programs.

Reversing resettlement in northern Peru benefits local families



The La Granja copper project, in a remote mountain valley in the province of Chota in northern Peru, was acquired in 2000 and closed in 2002. Families who had been displaced by the project in the mid-nineties are now buying back their former lands on a time-payment plan, and income from the sales are funding the development of their community.



► Community meeting at La Granja

The La Granja mining concession was acquired in November 2000. A feasibility study concluded, in November 2001, that the project was not viable. A social and environmental closure program was developed, which was completed in December 2002.

The rural families in the area of the project, and the families who had been relocated away from the project area prior to our acquisition, were living in poverty. The prior relocation of local families was not compatible with World Bank guidelines, and relocated families were worse off than when they lived in the La Granja area. Families who continued to live in the area also suffered social and economic impacts from the project prior to our acquisition. The local schools and medical centre had been closed as a result of the presence of the project.

A socio-economic study of the earlier relocation process provided the basis for developing the initial social program. The primary concerns of the population were found to be health and education. As a result, the program prioritised reopening the schools and the medical centre. The Company paid the cost of operating the schools for two school years and the medical centre for a year, until agreement was reached for the government to reassume its responsibilities in these areas. Until the medical centre could be reactivated, free medical services were provided to the community by La Granja's medical personnel. They continued to supplement the activities of the medical centre until project closure was complete.

Once the decision had been made to exit the project, a risk assessment was conducted to support the exit strategy. The assessment focused on the environmental and social consequences of various exit scenarios and was highly effective in supporting the final plan of returning relocated people to the La Granja area and in re-establishing a self-sustaining support infrastructure through the development of a foundation. The steps taken to implement the plan included:

- an intensive consultation campaign in December 2001, involving meetings in La Granja and each of the areas where there were concentrations of relocated people

- subsequent ongoing consultations, resulting in some modifications to the plan
- sale of approximately 2000 hectares of land back to its relocated original owners or, where the previous owner declined to buy, to other community members (these sales took place at less than half the price that the Company had paid for the land)
- access to independent legal advice for relocated families before they made the decision whether to rebuy their former land
- transportation for families returning to La Granja
- free medical checkups for returning families
- creation of the Foundation for the Development of the Upper Paltic with NGO participation (The Mountain Institute) at the board level
- support to the community in establishing a development association in each of the four villages in the immediate area of project influence to facilitate community interaction with the Foundation
- a project by The Mountain Institute to build the community's institutional capacity and help it identify development priorities for the Foundation
- publication of user-friendly guidebooks on each aspect of the closure process (land sale, return process, environmental remediation, the Foundation)
- donation of all proceeds of the land sales to the Foundation
- provision of materials or livestock to help returning families re-establish their livelihood (to be repaid to the Foundation over ten years)
- donation of materials or livestock to families who decided not to rebuy their former land, to help them consolidate their livelihood in their new location
- rehabilitation of school and medical centre infrastructure
- negotiation with the Ministries of Health and Education, at national and regional levels, for the reopening of the schools
- strict local hiring policy for environmental remediation work, resulting in the temporary employment of more than 200 people.

Unsold land, and land in the village centres, has been donated to the community development associations; and much of the camp furniture and equipment has been donated to local institutions.

PNG Sustainable Development Program Company begins planning community programs



As reported previously, in February 2002 we transferred our 52 per cent equity in Ok Tedi Mining Limited in Papua New Guinea (PNG) to PNG Sustainable Development Program Company. Establishment of the company has progressed well during the year. Program Company now receives all dividends that would formerly have flowed to BHP Billiton. The dividends will provide a sound basis for supporting investments in community development programs in the Western Province and in PNG more broadly, during and beyond the remaining life of the mine.



► Typical village setting, Western Province, Papua New Guinea

Our withdrawal from the OK Tedi operation occurred because we were unable to gain agreement from the other shareholders in Ok Tedi Mining Limited – the PNG Government and Inmet Mining Corporation – for early closure of the mine. We sought early closure because of concerns about the environmental impacts of the mine. The government preferred to continue operation of the mine because of the significant social and economic benefits it provides to Papua New Guinea. We recognised the importance of those benefits and respect the wishes of the PNG Government. The exit arrangements we put in place were designed to maximise these benefits while limiting the potential for further environmental impacts.

Program Company has been established with a strong emphasis on governance arrangements. Incorporated in Singapore, it has an independent Board of Directors comprising Dr Ross Garnaut (Chair appointed by BHP Billiton), Donald Manoa (appointed by the PNG Chamber of Commerce and Industry), Sir Ebia Olewale (appointed by the PNG Minister for Treasury), Dr Jacob Weiss (appointed by the Bank of PNG), The Hon Jim Carlton (appointed by BHP Billiton), Patricia Caswell (appointed by BHP Billiton) and Lim How Teck (appointed by the Program Company Board). The company has produced its first public annual report and held a public meeting to discuss the report on 12 June 2003.

To date, the company has received dividend payments totalling US\$41.5 million. These funds have been invested in short-term, low-risk investments pending commencement of the program implementation phase. Under the terms of the company arrangements, two-thirds of the dividends, after meeting taxation and administrative costs of the company, are to be invested in a long-term fund. This will enable the contribution of the company to continue beyond the life of the mine for a period of at least four decades. The remaining one-third of the dividends, after meeting company costs, is to be spent on current development programs in PNG, one-third in the Western Province and two thirds elsewhere in PNG.

The establishment of the development program is progressing well, with a number of projects identified for possible support. These include rehabilitation of the Highlands Highway and development of sustainable rubber, oil palm, cocoa and other agricultural industry in the Western Province and several other provinces. Also under consideration are eco-forestry and tourism projects and the generation of power from domestic gas, geothermal and hydro resources to support economic production and social services. Other projects have been identified in the areas of education, health and capacity building at the local level.

The company has six full-time staff in Port Moresby, Papua New Guinea. The establishment of partnerships with international aid agencies, government agencies, churches, other NGOs and private enterprise will facilitate implementation of the company's community development programs.

The company's annual report is available via PO Box 1786, Port Moresby, Papua New Guinea.

Pering mine – meeting the challenges of closure



The Pering lead/zinc mine in the remote North-West Province in South Africa ceased production in February 2003. Throughout its life, the mine has contributed to the communities around it. Now the mine's closure is presenting new challenges for its employees and communities.

Pering, which began production in 1986, is situated 20 kilometres from Reivilo, about 500 kilometres south-west of Johannesburg. The region is arid and rural, and beef farming and mining are the main activities. A local dairy factory, which employed up to 300 people for many years, closed in 1999. Pering employed approximately 200 people, mainly from the local communities of Reivilo, Taung and Kuruman, with the majority from Reivilo.

The mine had been expected to produce until 2004; but, by mid 2002, it was clear that market conditions and ore reserves would force an earlier closure. The last concentrate was produced in February 2003.

When the mine was built, a Housing Assistance Plan helped employees to purchase property. The mine developed and partially funded a sports and recreation facility with the community. It also built and stocked a library and developed sewerage and water reticulation systems for the mine houses. After these systems were given to the municipality in 1996, the mine assisted employees to pay for the service, increasing municipal funding and helping to develop further infrastructure.

The mine has paid the salaries of two teachers throughout the mine life. A computer training centre, funded by the mine, teaches people of all ages at no cost and will be expanded to provide a computer-based adult basic education and training centre. The mine has sponsored a community garden and a meals scheme for underprivileged pre-school children. Pering employees have participated actively in local affairs, and a number have served as town councillors and mayors.

Pering commenced closure discussions with labour, local NGOs, and local and national government organisations in November 2001, operating under the Department of Labour's Social Plan guideline, which was later passed into law. The relationships between this broad range of stakeholders proved extremely challenging; and, for a time, there was little progress with project delivery. This was largely because of the various stakeholders' lack of experience with the process, as it is new in the country. Political pressures, issues relating to control of resources and a lack of continuity of the government representatives involved all interfered with progress.

The closure process took a turn for the better when a consulting company was engaged to facilitate and to conduct community baseline studies and surveys, with the goal of identifying possible projects to mitigate the effect of job losses on Reivilo's economy. The consultants provided a strong chairperson who drove the process much more effectively than the mine had been able to do before. Despite some community resistance, the consultants were effective in getting the process moving and giving it direction. At the same time, the National Productivity Institute conducted a study that confirmed there was no alternative to closure.

The consultant's studies showed that, while Pering had contributed positively to the community, it was also responsible for most of the economic activity and was the only multiplier industry. Reivilo is an extremely poor, isolated community largely made up of the very young and the very old. There are few job-creation opportunities, and the town is only marginally sustainable.

In 2002, a senior national official of the Department of Minerals and Energy stepped in to take custodianship and act as facilitator in the closure process. All the participants had to adapt to a changing legal system. Politics remained a stumbling block, and the formal process appears not to have given adequate voice to the concerns of the local community and non-employees. The main outcome has been a non-profit company, formed to obtain and manage funds to drive projects. Structures and processes are about to be regulated.

Future closures in South Africa will remain a challenge, but there will be more experience and guidelines on which to operate. The key learning has been that the various stakeholder organisations must be engaged at as high a level as possible, as early as possible, because the top echelons of the organisations have the best understanding of their needs, strategies, and capabilities. Once objectives and strategy have been aligned at the top levels, in an atmosphere of cooperation, each organisation can then use its people to implement those objectives and strategy. Of course, the mine also needs to formulate its own objectives and strategy well beforehand. To participate fully in the process, local communities should be encouraged to form NGOs, to build common goals and to take charge of their future and aspirations.

Success depends not just on the mine but on all the stakeholders. Government organisations should provide guidance while being seen to be fair. A social closure plan, if it is to result in sustainable projects, must begin before the project starts and must live throughout the operation. In this way, trust and understanding, with positive contributions from all, can result in sustainability by the time the operation reaches closure. Failing that, a closing operation will not have the resources to deliver a desirable outcome.

Gag Island nickel project remains on care and maintenance



Our nickel exploration project on Gag Island in Papua commenced in August 1996, when PT Gag Nickel was established following the signing of a Joint Venture Agreement between BHP Billiton (75 per cent) and PT Antam (25 per cent). A Contract of Work was awarded in February 1998, and a program of exploration and preliminary evaluation was conducted. Since early 2000, following a change in forestry status that precluded open pit mining on the island, the project has been on care and maintenance status. PT Gag Nickel is maintaining close relationships with the local community and continuing a low-level environmental monitoring program.



► Gambier Bay, near the Gag Island nickel exploration project camp

Gag Island is located 150 kilometres west of Sorong. It is approximately 12 kilometres long and 8 kilometres wide, with terrain consisting of hills and plateaus. Dutch geologists first discovered nickel mineralisation on Gag in the 1950s. Subsequent investigations have confirmed that approximately two-thirds of the island is mineralised; however, the commercial viability of the deposit has yet to be confirmed.

A community of approximately 450 people live at Gambier Bay, adjacent to the Company's exploration camp. The community was established in the early 1960s by people from neighbouring islands who moved there in the hope of finding work. They have remained on the island since that time, despite a series of long delays in the development of the deposit, and remain supportive of mining and the related employment opportunities it may bring.

PT Antam, which is owned by the Indonesian Government, acquired Gag Island's mineral rights in the early 1990s. Following the establishment of PT Gag Nickel in 1996 and the undertaking of exploration and preliminary evaluation, the Company received a Contract of Work in February 1998. At that time, Gag Island was classified as 'Production Forest', allowing open pit mining.

In September 1999, as a result of Forestry Law (Number 41/1999) being enacted by the Indonesian Government, Gag Island was reclassified as 'Protection Forest', prohibiting open pit mining. No mine development work had commenced on the island at the time of reclassification.

As we will not operate in any protected forest area if it is contrary to Indonesian law, no development work has occurred since the reclassification. Studies associated with baseline environmental and social impact assessment have also been suspended.

These studies would need to be recommissioned before any further feasibility of the Gag Island project could be assessed. The studies would need to determine the most appropriate method of disposing of waste material from any mining or processing of nickel ore on the island. Preliminary options have included conventional dam storage, returning waste to the mined-out pits and the use of deepsea tailing placement.

Our consideration of this third option has attracted some criticism from NGOs concerned about potential impacts to reef environments around the island. We have made it clear in our communications on this issue that we would only consider this option if investigations prove that it is environmentally acceptable. Any decision will involve extensive consultation with the local community and the approval of the local government and the Indonesian Government.

The deferral of activity on Gag Island has been a major disappointment to the community at Gambier Bay, as short-term employment opportunities have had to be curtailed and the prospect of long-term, meaningful employment delayed once again. While the nickel project is in suspension, a small crew of Indonesian staff on Gag Island and Sorong in Papua are continuing to provide the community with potable water, assistance with a ferry service and local development activities.

Cerro Matoso's support for a central educational resource in Montelíbano, Colombia, enhances learning for thousands of students



Our Cerro Matoso nickel plant is located near the town of Montelíbano in the remote northern province of Cordoba in Colombia, South America. The area has historically been disadvantaged in terms of educational resources. Teacher training is insufficient, and schools lack facilities. As it is economically impossible to upgrade every school in Montelíbano, a shared central resource has been created – the Centre of Municipal Educational Resources. Cerro Matoso has led the development of the Centre, which opened its doors in 2002. Thousands of students from local primary and high schools are now accessing its educational programs and facilities.



► Students at the Centre of Municipal Educational Resources, Montelíbano



► A class in progress at the Centre

The Centre of Municipal Educational Resources is presently equipped with three classrooms, two physics laboratories, two biology and chemistry laboratories, two computer rooms and the latest technology. These resources are available to all students in the municipality of Montelíbano, from fifth grade to high school. Nearly 6000 students will benefit in 2003; and, with the planned addition of a further three classrooms, the number is expected to grow to 10 000 next year.

Teachers from the municipality have been able to improve, and in many cases begin, their basic training, particularly in such areas as information technology. Additionally, agreements have been made with five Colombian universities to utilise the Centre for undergraduate and distance education programs. This not only broadens the level of activities at the Centre, but also helps ensure its economic sustainability. The Centre has also become the focus of community development in Montelíbano, providing opportunities for the people from the wider community to acquire new skills.

The idea for the Centre arose in 1999, following a study that showed a major issue in the community was the poor standard of education and a high student drop-out rate. The local teachers were strongly in favour of the creation of a central education resource; and Cerro Matoso took the lead in promoting and developing the project, assisted by the Municipality of Montelíbano, the Diocese of Montelíbano, the Government of Cordoba, the Ministry of Education and the community at large.

With the support of Cerro Matoso, a committee of 25 teachers from different schools was formed to define the scope of the project. To assist their work, they undertook training in strategic planning and visited similar educational centres throughout the country. Guided by the vision of a brighter future for education in the region, they formulated a five-year strategic plan for the development of the Centre.

In 2001, the committee, with help from the local mayor and the teaching community, searched for and selected a site that met the criteria for the Centre, especially in terms of being close to the poorest student population in the municipality. The land was then purchased by the Governor's Office.

Later that year, the committee gained approval from the Municipality of Montelíbano and the Government of Cordoba to construct the Centre. A trust, managed by the San Isidro Foundation, was established to fund the development. Construction of the first phase of the Centre was completed in 2002, at a cost of US\$500 000.

From the beginning of the project, a lot of effort went into gaining the interest and approval of all levels of the community for the development of a shared central educational resource. This broad community involvement is reflected in the cross-section of people involved in administration of the Centre, which has helped underpin its success to date.

School headmasters in the province support the continuing growth of the Centre as the correct path for improving the quality of education and, consequently, providing young people with better educational opportunities so they in turn can contribute more to society.

The project has attracted attention in neighbouring municipalities, such as Puerto Libertador and La Apartada. There is growing interest in building a network of similar centres in the region, so that future generations can be better educated and more prepared to face the challenges of the new millennium.

Mozal program supports small and medium enterprises in Mozambique



Mozal 2 is the expansion of the primary Mozal aluminium smelter located on the outskirts of Maputo, the capital of Mozambique. During the original Mozal project, the use of local Mozambican contractors and particularly small and medium enterprises (SMEs) was limited and only partially successful. To improve our performance in enabling successful local participation, the Small and Medium Enterprise Empowerment and Linkages Program (SMEELP) was developed. The program has achieved significantly increased participation during the construction of Mozal 2 and is now recognised as a model for the development and sustainability of SMEs in developing countries.

Following a review of the Mozal 1 (first potline) experience, it was clear that, if the expansion project was to succeed in involving local SMEs, a new methodology would have to be developed. This imperative was reflected in the broader Mozal Empowerment Policy, which states that ‘the management of the Mozal Expansion Project is committed to maximising sustainable benefits to the local community using a combined strategy of development and use of local goods, services and personnel, without compromising project objectives’.

A commitment was made to:

- maximise the use of local labour (greater than 65 per cent Mozambican)
- provide skills training for local labour (train more than 3800 workers in construction skills)
- actively encourage the use of local contractors
- actively encourage the establishment of joint ventures between international and local contractors
- allocate selected work packages solely for execution by local SMEs
- promote SME training programs to enable local SMEs to be competitive and successful
- establish systems for monitoring and reporting of the project’s empowerment progress.

The target for the total local spend, including SMEELP and all other forms of local expenditure, was set at US\$80 million. Specific objectives were then established for the SMEELP, to facilitate the successful delivery of at least 25 SME contracts and the establishment of a sustainable SME training program.

To improve the likelihood of success of the Program, the SMEELP was established as a collaborative joint venture between Mozal, the Africa Project Development Facility (APDF) of the International Finance Corporation (IFC) and the Centre for Promotion of Investment (CPI) of the Mozambique Government. It was also planned that, after completion of the Mozal expansion project, the CPI would take over management of the Program to ensure its sustainability. The methodology was designed to be suitable for any company wanting to successfully utilise local SMEs.

The key steps in developing an effective SMEELP were deemed to be as follows:

1. Creation of SME packages
 - Packages solely allocated to SMEs
 - Ensure realistic scope in terms of size and complexity
 - Sufficient back-up time in case of failure
 - SMEs also included for standard packages, whenever possible.

2. Pre-assessment of SME capabilities

- SMEs financial/technical capabilities pre-assessed
- Capable SMEs recommended to the project by CPI
- SME database established and periodically updated.

3. Training

- Tender training (pre-tender): how to tender
- Induction training (post-award): how to execute contracts
- On-demand training: Quality Assurance(QA)/Quality Control/(QC), Business Management, etc.
- Training modules written and presented in local language, periodically updated.

4. Mentorship

- Custom-made mentorship plan for each SME
- Business mentorship: financial/commercial assistance
- Technical mentorship: on/off-site technical assistance, including Safety, QA/QC and Industrial Relations.

To help overcome the challenge of language differences and to facilitate the upgrading of SME infrastructures and technical standards, a dedicated bi-lingual Empowerment Coordinator was assigned to the SMEELP. The appointment also helped ensure that the project’s engineering, procurement and construction management (EPCM) contractor embraced the concept of SME participation. This was a major factor in the success of the SMEELP, with the EPCM contractor’s team playing a key role in driving the project.

The specific objective of awarding more than 25 contract packages has been achieved. As well, the transfer of know-how to SMEs through the training and mentorship program means a pool of trained SMEs is available for Mozal operations, future projects and other local requirements.

The program is sustainable and has been transferred successfully to our Hillside 3 expansion project in Richards Bay, South Africa. The proven methodology is also being adapted by the CPI and APDF for further implementation in Mozambique.

Internationally, in a field of endeavour that is typically littered with failures, the SMEELP is recognised as a successful SME development program and has been adopted as a model by the IFC and the World Bank.

SMEELP results to date include:

- 27 SME contract packages created
- 36 SMEs attended training
- 28 contract packages (including one standard package) awarded to 14 SMEs
- 12 contract packages successfully delivered
- No contract package cancelled
- In excess of US\$5 million allocated to SMEs.

Community

The San Isidro Foundation implements a Zonal Planning System to define areas of need for community programs

Cerro Matoso, our nickel operation in the north of Colombia, South America, carries out its community development initiatives through a Zonal Planning System implemented by the San Isidro Foundation.



► Two of the small business enterprises supported by the San Isidro Foundation

The San Isidro Foundation was created by Cerro Matoso and the Catholic Diocese of Montelíbano in 1981 as an independent non-profit organisation to promote a sustainable local economy and improve the quality of life of the people in the region of Alto San Jorge in the Cordoba department, where our integrated nickel mine and smelter are located.

With the participation of leaders from the 240 communities in the region (suburbs, rural districts and townships), a social baseline system was developed to identify the real-life conditions of the people. In 1999, the Foundation, together with the mayors of Montelíbano, Puerto Libertador and La Apartada, created the Zonal Planning System as a tool to classify priority needs and help determine community projects appropriate to each municipality.

Furthermore, a social category system was developed, which has been approved and accepted by the municipal governments to assist in their community development planning processes.

To promote economic development, the Foundation provides local companies and communities with technical support and financial assistance in education, training and technology transfer, with emphasis on supporting entrepreneurs to generate jobs and market their products, both of which are critical issues for small businesses.

Some of the specific areas targeted by the Foundation's social action program include training of effective leaders, promotion of community-based organisations, strengthening of municipal management, and encouragement of community participation.

As part of the long-term goal of promoting diversification in the region, hundreds of small industries also benefit from business consulting; guidance; and, in some cases, small credit allowances to support their growth and continued success.

To meet the community's varied needs, assistance programs are managed by specialised units in urban and rural entrepreneurial development. Through these units, training is provided to new entrepreneurs in the urban manufacturing, commercial and service sectors, as well as to rural producers so they can expand and diversify their production.



While increasing production yield in the region is an imperative, cultivating new markets is no less important, in order to sustain each undertaking. The current focus is on broadening domestic and international markets for products from the region's developing primary and secondary industries. Initiatives include exhibitions such as 'Expocórdoba' and 'Expocaucaasia', which are sponsored by the Foundation.

For business and community development initiatives to be successful, educated leaders are needed. Through the Foundation, special training programs for teachers are in place. In the areas of environment and health, the leaders are trained to help them promote health and develop infrastructure plans within their communities. Other initiatives include technical training workshops and youth programs.

The Foundation also plays a significant role in strengthening the functions of public administration so that sound planning and infrastructure programs are in place to support entrepreneurial growth activities. Management workshops have been established in the fields of regional development, civic legislation, urban planning and voluntary programs.

As a direct consequence of these initiatives, the benefits continue to increase, including potable water and sewage projects, new roads and paving, and programs to refurbish schools and universities.

The San Isidro Foundation has also provided crucial support for the establishment of Community Action Boards and Territorial Ordering Councils in order to maintain the spirit of progress in the region.

Planned diamond exploration in the Kalahari Game Reserve is unrelated to relocation of indigenous people

The Company is a 20 per cent shareholder in Kalahari Diamonds Limited, a joint venture operation that holds prospecting licences in Botswana, including areas of the Kalahari Game Reserve. The Botswana Government has been undertaking a program to resettle Indigenous people from the Reserve under its Remote Area Dwellers program. We are aware of the concerns of some people that there is a link between the relocation of the indigenous people and planned exploration activities by Kalahari Diamonds. However, we reject this assertion.



► Light plane equipped with the Falcon™ system on an aerial survey in Canada

At any one time since 1974, between 20 per cent and 75 per cent of the landmass of Botswana has been covered by prospecting licences, including large areas of the Kalahari Game Reserve. Year by year, the number of licences and area covered has expanded or contracted according to a range of factors, such as market demand, the findings of geological surveys or the introduction of new technologies.

In that time, more than 1400 new licences have been issued by the Government of Botswana. If there were any link between prospecting and the resettlement of people in Botswana, then much of the country's population would have been subject to relocation at one time or another, in advance of prospecting activity. In reality, any resettlement takes place strictly in terms of the Government's Remote Area Dwellers program, and there have been instances of communities being resettled into areas covered by existing exploration licences.

The area of land covered by the exploration leases held by Kalahari Diamonds is very large and will not be explored in its entirety. It is very likely that the leases for a substantial proportion of land will be surrendered, on the basis of desktop studies that involve no exploration at all.

Of the remaining areas, specific zones will be selected for airborne exploration utilising our Falcon™ system. The system enables high-resolution gravity gradiometer surveys to be performed from a light plane without any impact on the ground. Conventional ground-based surveys can be limited to tightly focused areas of interest, if any, minimising the potential for any disruption to local communities.



The relocation of indigenous communities is not a prerequisite for exploration activities to proceed. We routinely explore over similar areas and have never advocated the removal of indigenous or local communities prior to the commencement of exploration. An example is the exploration and development of our EKATI Diamond Mine on indigenous land in the Northwest Territories of Canada. The indigenous communities were not displaced and have been active participants in the development and success of the project.

Although we are a minority partner in the venture in Botswana and are not the operator, we recognise that we have an important role to play as a shareholder, in accordance with our Company Charter and HSEC Policy. We do not proceed with any activity that is in breach of our values.

Kalahari Diamonds has undertaken to conduct its activities in accordance with our policies and management standards. These prescribe consultation with affected communities, respect for the traditional rights of indigenous peoples and care for the environment and cultural heritage.

At present, there are no plans to explore in the central Kalahari Game Reserve before the second half of 2004; and extensive community consultation will take place beforehand. Kalahari Diamonds is already engaging with a number of community groups in Botswana, and we are confident the company will continue to engage responsibly and in a timely manner.

At the Area C project in Australia, an agreement with the traditional owners has enabled unique archaeological sites to be excavated and relocated

Native Title agreements that allowed development of the rich Area C iron ore deposits in the central Pilbara, Western Australia, were finalised in June 2001. As part of the agreements, the Company negotiated with the site's traditional owners to excavate and relocate a number of stone arrangements of great archaeological significance. They have now been moved to a safe location where they can remain undisturbed by future mining operations.



► Traditional owners Brian Tucker, Darren Smith, Alec Tucker and David Stock with archaeologists Bruce Veitch, Adrian Dilello and Fiona Hook

In 1982, surveyors came across the stone arrangements, which consisted of banded ironstone and chert stones buried upright in the ground. After consulting with the Aboriginal custodians, a decision was made to leave the arrangements untouched and to record the find with the then Western Australian Museum's register of heritage sites.

On taking over the site in 1990, BHP Billiton Iron Ore also took on responsibility for recording and protecting the stone arrangements. A survey, undertaken by archaeologists engaged to map the extent of the sites, showed there were well over 1000 stones in different-sized groups, ranging from just a few to several hundred. It was clear they had been deliberately placed and that some had been transported considerable distances to the site.

Applying a formal process appropriate to any activity related to indigenous archaeological sites, the Company consulted with the Aboriginal custodians regarding the proposal to conduct mining in the vicinity of the stone arrangements. Many of the local Aboriginal elders knew of the stone arrangements and, while uncertain of their origin, confirmed their significance in Aboriginal lore.

The Company began liaising with the traditional owners and archaeologists with expertise in Aboriginal heritage to plan for protection of the stone arrangements. One solution discussed was to place a buffer fence around the archaeological sites; but there was concern that, over time, mining activity could impact indirectly on the stones and damage their integrity. A request was presented to the Aboriginal custodians for the stone arrangements to be moved. After a period of deliberation, the custodians agreed that they could be relocated without destroying their cultural significance.



An agreement was reached that the custodians, the Company and archaeologists be involved in a joint project to relocate the stone arrangements to a safe area where they could be preserved, and this was enshrined as part of the Native Title agreements. In 1998, all parties formally signed the agreement to move the stone arrangements. An application was made to the Minister for Aboriginal Affairs, and approval was granted in 2000.

In 2002, the Company consulted with the custodians to find an appropriate location where the stones could be safely repositioned. A site with similar geographic features seven kilometres from the main stone arrangement was selected. A team of surveyors used global positioning technology to document the position of every stone. The information was then transferred to a grid map, and pegs were placed at the new site to ensure the stones would be relocated in exact matching positions.

Archaeologists photographed every stone with north points marked so they could be positioned with the correct orientation. Working with the archaeologists, teams from the two Aboriginal groups then used trowels and other digging equipment to carefully remove the soil from around the stones. Samples of sediment were taken from beneath a number of the stones so that tests could be undertaken to determine an age for the construction of the arrangements. Once excavated, the stones were wrapped in plastic, numbered and made ready for reburial at exactly the same depth and orientation.

The stone arrangements are now all in place at the new site. Studies are under way to date samples of the sediment taken from the stone arrangements, using optically stimulated luminescence dating techniques. Preliminary results suggest the arrangements could have been constructed and maintained from approximately 3000 years ago.

Tintaya addresses community concerns through formal consultation processes with stakeholders



For the past few years, long-standing community concerns about environmental and land management issues at our Tintaya copper operations in Peru, many dating from the days of state ownership, have been addressed through ongoing consultative processes with key community stakeholders. Recently, issues with regard to development of a new tailings dam have been raised by a group of community stakeholders not traditionally involved with the mine. The formal community consultation processes in place have provided a model for addressing this issue and seeking a solution that alleviates community concerns.



► Meeting with community leaders at Anta Collana



► Huinipampa dam site looking towards the Río Ccañipia

In December 2001, a facilitated meeting between Tintaya management and community representatives about environmental and social issues associated with the operation's activities led to the development of the Mesa de Diálogo, or Dialogue Table.

Since that time, participants in this forum have worked diligently to assess and resolve outstanding issues of concern.

Considerable progress has been made, and recommendations from the work programs are being progressively implemented.

Despite good progress on historical issues of concern, a recent matter has arisen that requires careful management. In early 2001, Tintaya management sought environmental approval for a new tailings dam to enable the life of the mine to be extended for a further ten years.

The approvals process followed by the mine was specified by, and complied with, relevant legislation in Peru. Although all legal requirements were met, it has recently become apparent, after the approvals were granted and the dam construction largely completed, that stakeholder representatives from areas downstream of the dam had not fully participated in the approval process.

The stakeholder representatives have expressed concern about the potential for seepage from the dam to contaminate their agricultural activities in the valley below the dam. Technical reviews by international experts have confirmed the acceptability of the basic design of the dam, given the benign nature of the tailings material to be stored. Despite this information, concerns have remained.

The Company is working with the communities involved to explain the data and provide assurances regarding compensation in the unlikely event that any impacts should occur.

In an attempt to fully address the concerns of the downstream communities, a decision has been made to implement additional environmental controls. These will include:

- a seepage control pond and associated pump-back system
- further hydrological investigation and mapping of natural seepages
- additional monitoring bores across the valley floor
- a joint monitoring program to enable community members to jointly collect and independently analyse water samples
- formalisation of compensation agreements in the unlikely event that impacts occur.

The Company will continue to consult with the communities to explain these additional controls and seek to address any outstanding concerns.

To further enhance its relationship with the local communities, Tintaya has participated in the development of a Convenio Marco, or Framework Agreement, that specifies the Company's environmental and social commitments going forward.

As part of this process, the mine has committed to spending up to 3 per cent of its pre-tax profits on community programs over the remainder of its life. This commitment, which is in excess of the Company's corporate target of 1 per cent of pre-tax profits, has been proposed due to the extreme needs of the impoverished local communities around the mine site. The Convenio Marco is now being formalised.

BMA Community Partnerships Program is based on extensive research of community needs



The BHP Billiton Mitsubishi Alliance (BMA) operates eight coal mines and the Hay Point coal export terminal in central Queensland, Australia. The total output of the mines accounts for more than a quarter of Australia's annual coal exports. For over 30 years, BMA has been supporting the communities in the townships where its employees and their families are located. Following an extensive consultation process to assess ongoing community needs, the BMA Community Partnerships Program was developed and launched.



► Blackwater mine manager Mark Hill (second from right) initiating a BMA supported youth project at the Blackwater Police Citizens Youth Club with (l to r) Kelly Conway, Sergeant Paul Christensen and Bryan Gunston

A review by BMA had shown that the substantial direct and in-kind support for community projects and activities by the company and its individual sites over recent decades was often overlooked or taken for granted.

From the review findings, it became clear that, because of BMA's failure to prioritise and address community needs on a coordinated basis, exacerbated by a period of prolonged and divisive industrial activity in 2000/01, the company was perceived throughout central Queensland as an organisation that did not care about people.

This was a disturbing finding, as BMA is the largest private employer in the region, employing 4500 people. They and their families live in townships that support populations of more than 30 000.

To reinforce its commitment to local communities and to sustainable development of the business, the company set out to develop a community support program that utilised best practice techniques in corporate community involvement.

A broad consultation process was undertaken, involving one-on-one discussions with employees and their families, representatives from local and state government, members of community groups and welfare organisations, training organisations and school principals.

Based on the discussions and an analysis of best practice community programs, the BMA Community Partnerships Program (BMACPP) was developed and officially launched in September 2002.

The BMACPP represents a new coordinated approach to community relations for the company's operations. The program comprises a targeted set of activities and projects, many through partnership arrangements that address needs clearly identified through the community needs assessment process.

Existing community support activities have been combined with a range of new initiatives under a branded, umbrella community relations program. Specifically, six key target areas were identified where BMA's involvement, in partnership with government and community groups, could make a difference. These are:

- youth support
- business and skills training
- community welfare
- sport and recreation
- arts and entertainment
- the environment.

During the consultation phase, many stakeholders talked about the general atmosphere of pessimism and mistrust in the region and warned that any community activities undertaken by the company might be viewed with cynicism.

In particular, women were feeling marginalised and threatened, while young people were leaving the region because of a lack of training and employment alternatives. The remaining youth were unable to access activities available in larger communities.

As a result, the BMACPP targets four key areas, namely:

- access to computer and Internet skills training, particularly for women
- access to improved vocational and adult education and training
- more supervised support for activities for youth
- improved literacy levels among adults and children.

BMA has committed A\$2.3 million to implement the Community Partnerships Program through 2002/03 – around double the amount spent on community activities in the previous year, before the launch of the new program.

Escondida: contributing to the progress of Chile



The Escondida copper mine in northern Chile is the world's largest source of copper. The mine plays a significant role in the country's economy. Chile's copper sales are equivalent to approximately 40 per cent of its exports and 7 per cent of its Gross Domestic Product (GDP). Presently, Minera Escondida accounts for 20 per cent of the country's copper production and is listed among the top ten national companies. Since mining began in 1990, the Company has contributed considerable amounts to the economy, through employment, the payment of taxes and the purchase of goods and services. In addition, the Company has supported local communities through health and education programs and other initiatives.



► The township of Antofagasta

BHP Billiton is major shareholder and operator of the Escondida mine, which is located in the Atacama Desert in Chile's Second Region. The site is 170 kilometres south-east of the coastal city of Antofagasta. A slurry pipeline carries the concentrate to a mechanised port built by the Company at Coloso, 14 kilometres south of Antofagasta. Offices are maintained in Antofagasta, Coloso and Santiago, the capital city of Chile.

Our efforts to become a valued and respected citizen commenced at the early pre-operational stages of Escondida in 1983 and have been ongoing since. An important decision was taken to structure the Company in a way that favoured payment of taxes in Chile rather than back to the countries of earnings consolidation. Another pivotal decision was not to apply accelerated depreciation, which benefited the Chilean economy by facilitating the early payment of tax.

It was also considered essential that the community should benefit immediately from the mine's development. When the camp for employees was constructed at the mine site, it was designed with their wellbeing in mind and included modern accommodation and recreation facilities. Hundreds of Company houses and apartments were also built for employees and their families in Antofagasta. These were located throughout the city to avoid creating a 'miners quarter'. There was an emphasis on recruiting local people and purchasing local goods and services, and employees were encouraged to direct their spending power back into the community.

A proactive community assistance program was also developed. This was managed by the Company's corporate affairs department until, six years after the start-up of mine operations, the Minera Escondida Foundation was established. Guided by a philosophy of developing human and social capabilities, the Foundation has continued to make significant contributions in the areas of education, health, and social and indigenous development, with an emphasis on young people.

In 2002, the Foundation expanded the program to support employees in their own social responsibility initiatives. In less than a year, projects co-funded through the program have involved the participation of 465 employees and an estimated 3365 beneficiaries.

The Company takes an active role in the local Mining Council to foster the development of mining as a sustainable industry in the region and to promote the social benefits contributed by the large private mining industry. For instance, the industry has played a key role in alleviating poverty in the country. While Chile has reduced poverty by 38 per cent in the last decade, the best performing area has been the Second Region, whose GDP is 65 per cent mining.

Escondida is playing its part. After 13 years of operation, the Company has invested a total of US\$4 billion in the mine and paid US\$1.7 billion in taxes. For the purchase of goods and services, Escondida spends US\$475 million annually, mostly in Antofagasta and the Second Region.

In addition, in line with BHP Billiton's Group-wide policy, the Company is committed to contributing 1 per cent of its pre-tax profit to social development programs, based on a three-year rolling average. As part of this, the Minera Escondida Foundation has spent US\$13 million over the last six years, principally in Antofagasta and the Second Region.

In recognising the contribution of mining, successive governments have supported the development and expansion of Escondida, with all parties focusing on creating sustainable value for everyone. This was summed up by Chilean President Ricardo Lagos in April 2003 when officially inaugurating the start-up of operations of Escondida's Phase 4 Expansion Project.

President Lagos stated that Escondida 'has understood that the modern way of doing business implies commitment to the community, to the people where its activities are carried out. This has been undertaken since a long time ago through the Escondida Foundation. You have invested in Chile because you know our country and you believe in it. And Chilean people are also working hard to continue progressing with you. Let us continue working together as we have worked so far'.

Of the total investment in the Escondida Phase 4 Project, 60 per cent was invested in Chile through contracts for services, materials and equipment. Over the 22 months of construction, employment peaked at 10 000 people, with 40 per cent coming from the Second Region. The expansion constitutes the platform on which future projects will be developed to support the production of copper at Escondida for at least another 40 years.

Establishing the foundations for facilitating the black economic empowerment process in South Africa's resources industry



South Africa is a changing nation, as historical and social imbalances are redressed in accord with the Government's Employment Equity Act and, specific to the resources industry, the Minerals Bill and Broad-Based Socio-Economic Empowerment Charter for the Mining Industry. Our South African operations have been playing an ongoing role in facilitating the transformation process through a wide range of black economic empowerment (BEE) programs and initiatives.

A significant step occurred in July 1998 when we announced our commitment to establish, with the support of other resources companies, a mining company known as NewCoal, ownership of which would be transferred to a BEE group. This came to fruition in November 2000, with the sale of 80 per cent of the company to Eyesizwe Coal. With four collieries producing around 18 million tonnes of coal annually, NewCoal is the fourth-largest coal producer in South Africa.

In September 2002, we entered into another empowerment project with the sale of one of our collieries to Kuyasa Mining, a junior miner that had established a neighbouring operation through a BEE initiative five years earlier. The colliery, which has a 15-year life span, provides Kuyasa with a solid base for future development in the coal mining industry. In addition, we have made significant reserves available to another BEE junior miner, Endulweni Resources.

Our operations are also introducing initiatives to support the development of smaller companies, such as the Small and Medium Enterprise Empowerment Program in place at our Hillside and Bayside aluminium operations. The program actively encourages the participation of local enterprises in Company projects, supported by training and mentorship.

In April 2003, we developed a BEE Procurement Policy for implementation throughout our South African operation. This is in line with our goal of identifying, developing and promoting the sustainability of BEE business through procurement, with the ultimate purpose of fostering entrepreneurship in black communities and increasing the participation of BEE suppliers in the mainstream of the resources industry.

Within our businesses, our Employment Equity Policy is in place at all operations, with the aim of redressing previous imbalances. Our goal is to achieve representation at all levels consistent with the demographic profile of South Africa. This is in accord with the Employment Equity Act, which is aimed at assisting people in designated groups – black people (Africans, Coloureds and Indians), women, and people with disabilities.

Our ultimate target is to achieve designated group representation across top, senior and middle management levels of 40 per cent. Since last year, steady increases have been occurring across all levels; and at 30 June 2003, total representation had reached 26.45 per cent. Further increases are expected as a result of accelerated development schemes and dedicated training and education programs. These include such initiatives as the Brightest Young Minds program, which we have supported since 2001. The program's vision is to create a platform that showcases the potential of the nation's brightest young minds and to fast-track their development for the benefit of South Africa. Of the participants in 2003, 78 per cent are from designated groups.

A major issue that is having a significant impact on all areas of development in South Africa is HIV/AIDS. Many of our businesses are in areas where the incidence of the disease is among the highest in the world. To care for our employees and assist the broader community, we are participating in a range of support projects with government, community research and industry groups.

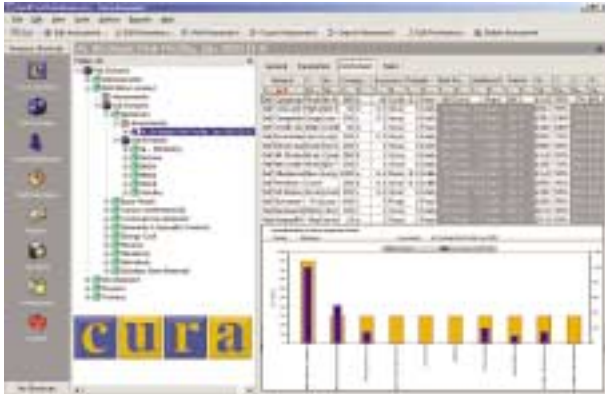
A case study to further indicate the Company's commitment to the BEE process is the closure process for our Rietspruit coalmine. When the mine closed in 2002, we handed the mine town over to the local people, who have begun converting the area into a self-supporting village. Located near Witbank, north-east of Johannesburg, the former mine town has a range of facilities, including living quarters, shops and recreation facilities.

Our immediate focus has been on reclaiming and restoring the mined areas and creating employment for those who have decided to stay. For example, a small farming project has created 38 full-time jobs. Other employment activities include plastic injection moulding, fish farming, soap manufacturing, meat and food processing, and arts and crafts. A Village Bank and Community Trust are also being created to involve the residents in the future development of their town.

HSEC considerations are integral to our Enterprise-Wide Risk Management strategy



The effective management of risk is seen as being central to the continued growth and success of the Company. To this end, risk management processes are being embedded into all our critical business systems and processes through implementation of an Enterprise-Wide Risk Management (EWRM) strategy. When critical decisions are being made, managers are required to look beyond the obvious risks and recognise all sources of uncertainty, including issues related to health, safety, environment and community.



► Purpose-designed risk management information system

A central element of the EWRM strategy is leveraging risk management information. The Company-adopted system assigns risks, controls and actions to accountable managers and enables management to track and report progress on all risk control activity. This system is also being used to 'roll-up' risk issues so that the Company can see all its major residual risks, along with opportunities for greater value creation through strategic risk management. The system is being used specifically to roll-up HSEC risks to obtain such a Company-wide perspective.

The ultimate aim of the Company's EWRM strategy is to embed risk management in all we do so that it truly becomes everyone's responsibility – as part of the BHP Billiton way.

The embedding of risk management processes is taking place at all levels of the organisation, so that risks associated with changes or investments can be systematically identified and managed in a comprehensive and integrated way.

Particularly, EWRM requires managers to understand the risks associated with the activities under their control and to manage them accordingly; and this acts to stimulate and reinforce accountability. The context of all our risk management activity is always the achievement of our business plan and strategic objectives. Because there is a continuous focus on the events and issues that might affect how and when those strategic objectives are achieved, we are building resilience into our business at all levels.

To steer the implementation, an advanced EWRM framework has been developed, comprising policy, standards and guidelines that set exacting standards for management. The HSEC Risk Management Guidelines are consistent with this framework.

Each asset and business has gone through an objective process of risk assessment and has evaluated its current risk management approach and systems against a standard. The risk assessments have highlighted where further control action is required, and this is now being taken. Where gaps in the system of risk management were identified, a risk management plan has been prepared and is being implemented.

Corporate governance requirements are satisfied by the assessment of progress in risk management plans and in improvements in risk control, which is reported to business-level risk management and audit committees that in turn all report to the Risk Management & Audit Committee of the Board.

To coordinate all risk management activities, risk management 'champions' have been appointed at each operational location or function. They work as a Community of Practice, sharing information about initiatives and best practice.

New study indicates potential for improving the environmental performance of stainless steel made from our nickel and chrome products



All products in our Stainless Steel Materials portfolio have life cycles that begin with the extraction of raw materials and progress through manufacturing to consumption and finally disposal or reuse of the end products. Throughout the product life cycles, inputs include resources and energy, while outputs include air emissions, water, wastes and commercial products, many of which play useful roles in our everyday lives. This year we completed a study to help us better understand the environmental strengths and weaknesses of our processing operations and the environmental impacts and benefits of stainless steel (made from our products) during its life cycle.



► *Nickel and chrome are key components of items we use in our everyday lives*

Following our previously reported life cycle assessments (LCAs) of our main nickel and chrome products, the new study centred on our QNI Yabulu Refinery in north Queensland, Australia. Conducted with the BHP Billiton Newcastle Technology Centre, the study was undertaken to determine how changes in eco-efficiency of the plant operation since 1998, and the proposed introduction of new technology as part of future expansion, could deliver improvements in the environmental performance of stainless steel made from our nickel and chrome products.

The impact assessment is based on the following inventory values:

- Resource energy
- Greenhouse gas emissions
- Oxides of nitrogen
- Oxides of sulphur
- Suspended particulate material
- Acidification potential
- Nutrification potential
- Photochemical ozone formation potential
- Solid waste.

The study found that, when compared with the current mining and refining process, the expanded Yabulu Refinery would significantly reduce the environmental impacts of nickel production. This is particularly pleasing when it is considered that approximately 40 per cent of production from the proposed expanded Yabulu Refinery would still be provided by the current process, meaning there is scope for even greater improvement.

We have conducted and been involved with previous LCA studies on nickel and chrome products, including the Nickel Development Institute (NiDI) worldwide nickel LCA study and the pilot project performed at the BHP Billiton Newcastle Technology Centre for the purpose of establishing a baseline stainless steel case study. Both these studies were described in the 2002 BHP Billiton HSEC Report.

In addition to details of our LCA studies, we have information on health, safety and environmental issues associated with our products available on-line. This system provides BHP Billiton businesses with access to relevant current and proposed legislation, life cycle inventory and assessment information, safety data sheets on different materials, and health and environmental data on our products.

Based on this and other relevant information, we provide advice on the responsible use of our products to immediate customers, end-users and other interested parties. This advice includes information on product use, storage, transport, recycling and disposal.

Ultimately, by taking a whole-of-life view of our products, we aim to ensure that they are sustainable and valuable to our customers and shareholders. Nickel and chrome are key components of long-life, recyclable products, including stainless steel. When the life cycles of these products finish, there is always the same amount of nickel or chrome existing as at the beginning.

At the end of their product life, stainless steel and most nickel and chrome alloys are recycled into new stainless steel, which usually contains around 50 per cent recycled material. Properly applied, materials containing nickel and chrome can help maintain and improve our quality of life and provide sustainable product solutions.



Green Lead™ project aims to achieve Zero Harm from lead exposure

The global Green Lead™ project, as reported in our 2002 HSEC Report, is an initiative of the lead industry. Our Base Metals business is actively involved, primarily through the Cannington silver/lead/zinc mine in north Queensland, which initiated the project. The vision of the Green Lead™ project is to independently certify that producers are applying best practice to all aspects of the product life cycle – mining, processing, transporting, treating, manufacturing, storing, using and recycling. A group of foundation project partners, representing industry stakeholders involved in mining, smelting, manufacturing and recycling, is involved in implementing the project.

The Green Lead™ project proposes to take a ‘whole of life cycle’ approach to lead and its impacts on people and the environment and to analyse all of them. The Life Cycle Analysis (LCA) will be the foundation stone upon which the industry’s mitigation responses will be built.

A formal plan for progressing the Green Lead™ project is currently being drafted, and the project’s founding partners are developing two initial activities around the LCA framework – site facility pilot programs and certification audit trails.

The pilot programs will aim to identify and quantify the environmental, safety, health and social impacts associated with lead exposure throughout the lead life cycle, utilising LCA as one of the tools. Specifically, participants will identify all the potential sources for lead leakage into the environment. The pilot programs will also aim to identify any remediation issues and evaluate how to address them through remedial site management programs, plans and reports.

It is proposed that the results and outcomes of these pilot programs will help in creating an entire industry LCA and contribute to the development and drafting of Green Lead™ performance criteria and standards. These will cover such areas as environmental protection, workplace health and safety, and community issues associated with lead exposure.

The second activity, certification audit trails, will be developed in conjunction with the pilot programs. These will also be undertaken to assist in the development of the performance criteria and standards and an industry-wide certification criteria and processes. Certification would be achieved when an operation is managing its environmental, workplace and community impacts in a way that meets the agreed criteria.

As a key part of the whole process and following on from the LCA framework, it is proposed to develop a Product Stewardship Protocol. This will document the measures to be taken by each of the project participants to eliminate, offset or minimise any adverse consequences of the impacts of lead and to maximise its benefits.

An example may be the prescribing of covered transport vehicles to prevent the lead concentrate from escaping to the environment during transport, or it may address the use of renewable energy. There will be many detailed measures addressed in the Protocol, varying across the different sectors of the industry. The aim is to produce actions that are transparent, robust and verifiable.

All aspects of the development of the LCA and the Product Stewardship Protocol will be reviewed and validated by independent experts. In addition, a broad group of stakeholders will be invited to contribute their opinions and views, including environment NGOs, governments, communities and other members of the lead industry.

While the Green Lead™ project will be complex and difficult, it offers the potential to deliver significant benefits to the industry, the economy, users of lead products, their communities and the environment.

Further information on the Green Lead™ project can be found at www.greenlead.com



► Green Lead™ Certification Criteria



Mining industry stakeholders look at developing a system for independent certification of environmental and social performance

We are actively involved in the Mining Certification Evaluation Project to evaluate whether an independent certification process of environmental and social performance can be applied to the mining sector. The project seeks to build consensus on measurable and auditable standards for on-ground performance and is led by the World Wide Fund for Nature, in conjunction with industry, NGO, union, academic, financial sector and government stakeholders.



► *The MCEP ultimately hopes to enable differentiation of minerals operations on the basis of environmental and social performance*

Poor environmental performance and consequent social impacts by some mining companies have affected the reputation of the whole resources industry. The industry has responded to public concerns by introducing a range of voluntary initiatives to better manage environmental and social issues arising from mining operations and to communicate these to the public. While some companies have made advances in environmental and social performance, these advances have largely gone unrecognised and unrewarded because of the absence of a credible mechanism that can differentiate on the basis of performance.

Independent third party certification of environmental and social performance is proposed as a mechanism to enable mining companies to operate to an agreed level of on-ground performance and to be able to credibly demonstrate this to stakeholders.

The project aims to:

- allow for a structured and focused debate among key stakeholders on issues of environmental and social performance
- result in a series of reports detailing stakeholder views on the issues and identifying points of agreement and conflict and any options identified for a certification system
- identify whether a system with broad industry and NGO support for the independent certification of the on-ground performance of individual companies in the mining sector is feasible.

A project Working Group has been formed, comprising participants from the mining industry, environmental and social NGOs, unions, governments, academics, the financial sector and certifiers. The Working Group is exploring options for building consensus on principles of environmental and social performance in the minerals sector.

Through the Working Group, the project is:

- exploring options for, and seeking to build, consensus on measurable and auditable standards for on-ground performance
- undertaking an evaluation in a field trial of the model or models developed (this stage requires companies to volunteer a mining facility to be the subject of the field trial)
- planning to prepare and publish a report containing recommendations for further action.

Should this initial evaluation project succeed in developing a model with broad support from the Working Group participants, it is hoped that the project's scope will be broadened to include a wider debate with other members of the Australian and international community.

If successful, the broader international consensus could lead to the development of a global system for independent certification of on-ground performance. This would allow mining companies to credibly demonstrate their competence, thereby attaining the competitive advantage available to those able to prove their commitment to sustainable development.