

Xstrata Copper North Queensland Division Sustainability Report 2005



SCOPE OF THIS REPORT

This report details the health, safety, environment and community (HSEC) performance of Xstrata Copper's north Queensland operations from 1 January 2005 to 31 December 2005. This includes the HSEC performance of the copper operations at Mount Isa Mines, Ernest Henry mine, the Townsville copper refinery and Townsville Port operations.

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For a comprehensive review of Xstrata's HSEC performance at its north Queensland operations please also refer to the following reports:

- Xstrata Mount Isa Mines Limited Sustainability Report 2005;
- Xstrata Copper Ernest Henry Mining Sustainability Report 2005; and
- Xstrata Townsville and Bowen operations Sustainability Report 2005.





Chief Executive's Message

Xstrata Copper's business strategy is to maximise value for Xstrata's shareholders by successfully growing and managing an industry-leading portfolio of copper assets that deliver superior returns. Associated with this strategy are more specific objectives relating to the areas of health and safety, environment, community and people, namely:

- Injury free, safe work environments for our people
- Continual improvements in environmental performance
- A reputation for social responsibility, and
- Realisation of the full potential of our people.

We are passionate about pursuing this strategy and these related objectives. We are also convinced that our success absolutely depends on the partnerships that we build with our employees and their families, communities, governments and other stakeholders.

In this sustainability report for north Queensland, as with those being produced by our other divisions and within the individual site reports, we have provided information on how our people are progressively working towards the achievement of these strategic objectives. These reports also demonstrate how our convictions about health and safety, environmental and social responsibility translate into the way we do business every day.

Improving our safety and environmental performance

Last year in our operations a strong management and organisation focus helped Xstrata Copper continue to improve its safety performance. This included almost halving the total recordable injury frequency rate (TRIFR) from 24 in 2004 to 12.9 in 2005. However tragically, a fatality occurred at the Las Bambas exploration project in Peru early in the year with the death of Mr Elmer Cordoba.

The continuing implementation of site Environmental Management Systems (EMS) at all Xstrata Copper sites resulted in improved environmental performances during the year.

At Minera Alumbra, during 2005 ISO 14001 accreditation was attained at the port, filter plant and concentrate pipeline facilities. Integration of smelter operations and air quality management at Mount Isa Mines, in north-west Queensland, Australia, remained a focus area during 2005. Commencing in 2006, Xstrata Copper is targeting an increase from 80% to 95% capture of total sulphur dioxide emissions from the Mount Isa copper smelter.

Further safety and environmental performance and systems improvements are expected at our operations this year following the implementation of recommendations from the Xstrata plc HSEC Assurance Audits that were conducted during 2005.

Extending our commitment to Corporate Social Involvement (CSI) and community engagement

Commencing in 2005 and following extensive community consultation, Xstrata Copper developed and launched a three year \$4 million Xstrata Community Partnership Program in north Queensland, focusing on health and education. The program has been further extended in 2006 to include additional initiatives in north Queensland. It will also

comprise a \$2.5 million commitment over three years to social welfare, health and education initiatives throughout Queensland on behalf of Xstrata's three commodity businesses operating in Australia (copper, zinc and coal).

In Argentina, Minera Alumbra continued to support local communities with an annual commitment of US\$1 million on an extensive set of programs focusing on health, education and sustainable development. During the year the Alumbra social initiatives were significantly extended to include a US\$3 million commitment over four years to specified health and education infrastructure works in Catamarca and US\$3 million over three years for identified health infrastructure in Tucuman, in both cases through partnerships with the respective provincial governments.

A range of social initiatives were implemented at the Las Bambas project in southern Peru during 2005, as exploration activities commenced. Priority areas included relationship building and awareness workshops with local communities, capacity building programs to improve the local skills base for project-related work, and partnering with local communities, NGOs, service providers and government to commence sustainable, local projects to improve nutrition levels within the communities.

The Las Bambas CSI program, currently under development, will commit US\$1 million per year over the next three years towards sustainable agribusiness and tourism projects in the area. It will also include a skills training program for members of the local communities.

During the year, Xstrata formed an Independent Advisory Group (IAG) to help ensure that the Las Bambas project manages the complex social and environmental issues associated with mining operations in a socially acceptable way.

Commitment to standards and best practice performance

Xstrata Copper has a strong commitment to the International Council of Mining and Metals (ICMM's) principles for sustainable development and the Minerals Council of Australia's (MCA's) 'Enduring Value' framework for sustainable development, both of which form the basis of Xstrata plc's own HSEC Standards.

Importantly, the people at our operations are committed to best practice health, safety, environmental and socially responsible performance in line with these standards. We are actively pursuing industry leadership across all these areas, and I believe that these sustainability reports are an effective way for us to share with you our progress in this regard.

Charlie Sartain
Chief Executive
Xstrata Copper



Chief Operating Officer's Message

The business strategy of Xstrata Copper's north Queensland Division is to maximise value for Xstrata's shareholders by successfully managing a sustainable, integrated copper business that produces 300,000 tonnes of copper cathode a year.

We are passionate about improving our safety and environmental performance and increasing the level of social involvement in our local communities. We know this is possible only by using business practices that are socially, environmentally and economically sustainable and transparent. We also know that to be successful in our objectives we must work in partnership with our employees, local communities and other stakeholders.

In this sustainability report we have provided details about our performance against our 2005 targets, which are progressing towards our strategic objectives. We have expanded our sustainability reporting to include three site reports: Mount Isa, Ernest Henry and Townsville, in addition to an overall north Queensland report.

In 2005 we achieved a record copper in concentrate production of 306,492 tonnes at our north Queensland operations.

Our sustainability highlights for 2005 include:

- A 30% improvement in our safety performance, with no fatalities.
- The undertaking of the Xstrata plc health, safety, environment and community (HSEC) internal audit review which achieved encouraging results, supporting the development direction of our safety and health management system and ensuring our systems and performance meet the expectations of a resources company operating in a world market.
- Mount Isa Mines received the Metalliferous Employer of the Year Award at the annual Mining Industry Skills Centre Training Awards for its application of the Xstrata north Queensland Operations Training Management System. This system also won the coveted 2005 Queensland Mining Industry Excellence in Training Award.

- A total waste management system was established which enabled Mount Isa Mines to manage wastes generated on site to industry best practice standard. All waste streams are tracked, enabling better separation and recovery of scrap metal.
- The fluo solids roaster (FSR) at Mount Isa was decommissioned in 1997 after almost 30 years of service. To ensure a progressive approach to site rehabilitation, the demolition of the old FSR commenced in 2005, and is scheduled for completion in early 2006. About 3,500 tonnes of steel will be recovered for recycling.
- In line with Xstrata's commitment to corporate social involvement, we launched the Xstrata Community Partnership Program in north Queensland in December 2004. The program is contributing more than \$4 million to vital community initiatives. We have achieved many successes with Xstrata's partners across north Queensland in the first year of the program.
- In 2005 the decision was taken to create a step change in the already high quality of our apprenticeship training by building a custom designed Xstrata Skills Centre. Xstrata's north Queensland operation runs the largest apprenticeship program in north-west Queensland with 60 new apprentices recruited in 2005 and projected total apprentice numbers to exceed 300 from 2007.

In 2006 we will continue execution of our best practice approach to performance in safety, environment and community partnerships as we work towards recognition as an industry leader in these areas. Among a number of improvements, we will further reduce our injury rates, improve capture of emissions and increase our corporate social involvement commitment.

Our sustainability reports are designed to share our progress with you and we would welcome any feedback about the reports. Please email your comments to nqsustainability@xstratacopper.com.au or write to me at Xstrata Copper, PMB 6, Mount Isa, QLD, 4825.

Barry Grant
Chief Operating Officer
Xstrata Copper North Queensland



Our Approach to Sustainable Development

For Xstrata, sustainability is about caring for the environment in all stages of mining and metal production; efficient and responsible use of resources, including energy, water and land; keeping our employees safe and healthy; improving services and facilities in communities where our employees and their families live; helping these communities to build the capacity to sustain themselves as vibrant, self-reliant centres; and providing our shareholders with a highly profitable return on their investment in our business over the long term.

XSTRATA COPPER'S DEFINITION OF PURPOSE

We will maximise value for shareholders by successfully growing and managing an industry-leading portfolio of copper assets that deliver superior returns.

We will achieve this in a safe, environmentally and socially responsible way, in open partnerships between our people and with communities, governments and other stakeholders.

Strategic objectives

- Injury-free, safe work environments
- Continual improvements in environmental performance
- Reputation for social responsibility
- Leadership in the copper industry
- Realisation of the full potential of our people
- Achievement of the full capacity of our physical assets
- Cost competitiveness through the cycles
- Value creation through dynamic growth and continuous improvement, and
- Effective implementation of common key systems and strategies.

Values

Our decisions and actions will demonstrate the following values:

- Honesty
- Dependability
- Respect
- Confidence
- Ingenuity
- Courage
- Passion

Our global perspective

Xstrata plc maintains a meaningful position in six major international commodity markets – copper, coking coal, thermal coal, ferrochrome, zinc and lead – under four commodity businesses: Xstrata Copper, Xstrata Zinc, Xstrata Coal and Xstrata Alloys. The Group's operations and development projects span five continents and nine countries: Australia, South Africa, Spain, Germany, Argentina, Peru, Columbia, United Kingdom and Canada.

ENDURING VALUE – A FRAMEWORK FOR SUSTAINABLE DEVELOPMENT

Xstrata Copper is a signatory to *Enduring Value – the Australian Mineral Industry Framework for Sustainable Development*. This framework was developed and launched by the Minerals Council of Australia (MCA) in October 2004 to give practical effect to the International Council on Mining and Metals' (ICMM) sustainable development principles.

The key role of *Enduring Value* is to translate the principles of sustainable development into practices that ensure industry operates in a way that meets community expectations and maximises the long-term benefits to society by effectively managing Australia's natural resources.

As a signatory to *Enduring Value*, Xstrata Copper has obligations to include progressive implementation of the ICMM Principles and Elements, public reporting of site level performance at least annually and assessment of the systems used to manage key operational risks (using either internal or external assessment as appropriate).



Contributing to our economy

Xstrata Copper has demonstrated its commitment to maintaining the proud history of the mining and metals processing operations it has acquired and to providing an exciting future for the communities in which it operates.

The north Queensland communities of Mount Isa, Cloncurry, Townsville and Bowen are reaping the rewards from more employment opportunities, our support of local businesses, our ongoing funding of community projects and our contribution to government taxes and charges.

The combined copper and zinc businesses contribute to the economy through:

- employment of 4,500 people, including contractors;
- an annual wages bill in excess of \$300 million, most of which is spent in north Queensland;
- apprenticeship and youth training opportunities of \$4.4 million;
- \$245 million spent on purchasing regional goods and services;
- \$390 million spent on purchasing goods and services in Queensland;
- \$3.7 million paid in annual rates to local councils;
- annual contributions of more than \$1.4 million, directed to community partnerships, donations, sponsorships and community programs;
- \$145 million in rail, power and water charges; and
- \$63.5 million paid to Governments in taxes and charges.

OUR PRODUCTION

Xstrata Copper's north Queensland Division consists of:

- Mount Isa Copper Operations Metallurgical Operations Administration and Services;
- Ernest Henry Mining, Cloncurry;
- Copper Refineries Pty Ltd (CRL), Townsville; and
- Townsville Port operations.

Mount Isa Mines

In 2005 Mount Isa Mines' world class underground ore bodies produced 5.6 million tonnes of ore, 177,000 tonnes of copper in concentrate and 220,000 tonnes of copper in anode, using state-of-the-art mining and processing technology.

Through Xstrata's vision to create a secure future for Mount Isa, we have invested more than \$115 million in new projects. The development of the Northern 3500 underground copper ore body has provided an additional high grade mining zone in the Enterprise mine. Copper production is also being boosted through a copper leaching project and planned improvements to the copper smelter.



"The permanent part-time shift has certainly been a success for us. It has kept our trucks working and material movements up. Instead of parking trucks during breaks, we keep them working," he said.

One of the main challenges faced in introducing permanent part-time drivers was getting the workforce to adapt to a day shift of drivers – something that was new for everyone concerned. Over time the workforce has seen the benefits of improved utilisation of equipment on a daily basis and the value of having relief drivers has become better understood. The other main challenge was ensuring that the new trainees were safely integrated into the mine operation.

New recruits receive intensive training before they are allowed to drive alone.

A truck simulator, configured for either an 830E Komatsu truck or a 793 Caterpillar truck, is also used to ensure that drivers are trained to respond to situations such as a tyre fire or wet weather within the correct safety guidelines and without endangering people or equipment.

Mother of three, Colleen Power, became a part-time haul truck operator because she was looking for a change from sales and cleaning jobs and the family-friendly shifts made the truck driving job attractive.

Colleen hauls waste and ore in a 200-tonne truck that is about 14 metres long, almost seven metres high and can weigh more than 400 tonnes when fully loaded.

"It's scary to begin with, but once you get over that initial scare factor, it's like hopping in the car and driving down to the shops," Colleen said.

Although already qualified to operate Komatsu 830E, Caterpillar 785 and Caterpillar 793 trucks, Colleen hopes to acquire more skills and would consider other mining roles when her children were older.

"Right now the permanent part-time work is great for me and my family – the kids have mum morning and night and we are able to get ahead as a family from a job that pays well."

Women comprise 30% of Ernest Henry's workforce, with several women working as full-time mining technicians and 14 employed in administrative roles.

case study

WOMEN AT THE WHEEL

The introduction of a permanent part-time shift at Ernest Henry mine has overcome idle time issues on the mine's haul trucks and created job opportunities for women in Cloncurry.

Former Ernest Henry Mining Manager Andrew Miller was looking for a way to improve equipment utilisation at the mine in 2004 when his mining team joined with the human resources team to develop the concept of permanent part-time drivers.

The shift operates between 9am and 3pm and was introduced to cut the amount of time haul trucks were standing idle due to breaks and shift changes. The new day shift was marketed to local mothers who were likely to have children in school or day care and who were looking for work that blended in with their family responsibilities.

Eight of the nine part-timers driving haul trucks are women, most with children at home, and the mine provides a bus to transport the part-timers from the town each day.

Superintendent Employee Services, Administration and Community Relations, Andrew Uphill, said it was a win-win situation, producing positive outcomes and percentage increases in equipment utilisation.

Ernest Henry Mining

The Ernest Henry copper-gold deposit, located 38 km north-east of Cloncurry, is the third largest copper ore body in Australia. In 2005 it mined 11.4 million tonnes of ore, produced 129,000 tonnes of copper in concentrate and 167,000 oz of gold in concentrate.

The Ernest Henry mine produces a value added concentrate on-site. The concentrator is a single line plant using contemporary equipment, designed to treat nine million tonnes of primary ore a year, which equates to treating nominally 1,200 tonnes per hour. Tailings are pumped to an engineered tailings storage facility for long-term containment. The concentrate is either transported by road to Mount Isa where it is smelted and refined at Mount Isa Mines' copper refinery in Townsville or exported through the Port of Townsville.

The final pit will have a perimeter of 1.5 kilometres and width of 1.3 kilometres, with an overall depth of about 570 metres. The pit is being mined in 16 metre high benches which have an average wall slope of 70 degrees.

Capital expenditure at Ernest Henry mine has been significant, with Xstrata spending more than \$70 million in the past two years on equipment and improvements. In a productivity and job creation initiative, the mine has solved idle time issues on its haul trucks by introducing a permanent part-time day shift. The shift has been enthusiastically embraced by local women looking for school hours work (see case study).

Townsville operations

Xstrata's Copper Refineries Pty Ltd (CRL) in Townsville and Townsville Port operations form a major part of the group's north Queensland operations.

CRL refines Mount Isa-produced anodes (99.7% pure copper) to copper cathode for domestic and international sale as ISA brand 99.995% pure copper. In 2005 CRL produced 219,000 tonnes of saleable cathode.

The Townsville Port operation handles mineral concentrates in and out of the port and fertiliser out of the port. In 2005 the port operations handled 1,100,773 tonnes of concentrate into the facility, 1,075,947 tonnes of concentrate out of the facility and 834,582 tonnes of fertiliser out of the facility, involving 97 ships.

Production facts

Copper	2005 production
Mount Isa	5.6 million tonnes of ore mined 177,000 tonnes of copper in concentrate 220,000 tonnes of copper in anode
Ernest Henry	11.4 million tonnes of ore mined 129,000 tonnes of copper in concentrate 167,000 oz gold in concentrate
Townsville refinery	219,000 tonnes of copper cathode



Caring for our people

The health and safety of our employees is critical to the business success of Xstrata Copper's north Queensland Division. We believe that all work-related incidents, illnesses and injuries are preventable.

HEALTH AND SAFETY

We strive to achieve our goal of zero harm through health and safety leadership at all levels, effective health and safety systems, compliance with Xstrata's 17 HSEC Management Standards, and the introduction of behavioural-based programs.

During the year, we updated and restructured our occupational health and safety management system (OHSMS) to align with the Xstrata

plc HSEC Standards and HSEC Policy, Australian Standards AS:4801, AS:4804 and AS:4360, and the *Queensland Mining and Quarrying Safety and Health Act (1999)* and Regulations (2001). This updated system is progressively being implemented across our operations.

Health

■ Overcoming occupational health challenges

The key occupational health challenges facing our operations at Mount Isa, Ernest Henry and Townsville are around exposure to arsenic and other heavy metals; long-term employment in physical roles that could contribute to degenerative musculoskeletal conditions; and working in hot environments. We manage these issues through the assessment of exposure in accordance with internationally recognised monitoring standards, implementation of controls to eliminate or minimise exposure to the hazards, and the provision of personal protective equipment where controls do not effectively reduce the risk of exposure.



Medical Laboratory Analyst Kara Mayocchi analysing drinking water samples from various community localities. Samples are routinely tested in the laboratory.

« Maintenance Team following safe practices while relining No.5 Ball Mill at the Copper Concentrator.

HEALTH AND SAFETY PERFORMANCE

2005 Targets	Performance
Mount Isa copper operations	
Zero fatalities	✓
LTIFR < 2.7	✓ (2.3)
DIFR < 13.3	✗ (18.4)
TRIFR < 24.5	✓ (20.0)
Ernest Henry	
Zero fatalities	✓
TRIFR < 8.9	✗ (12.4)
All staff to have access to PASS on a shift by shift basis	✓
Review orientation process	✓
Establish an Emergency Response Team (ERT) training facility	✓
CRL	
Zero fatalities	✓
TRIFR < 24.9	✓ (20.4)
Improvement in risk assessments	✓
Implementation of an improved incident investigation methodology	→
Port	
Zero fatalities	✓
All employees attend training in the safety observation program	✓
All employees attend risk assessment training	✓
Actively participate in the Townsville Operations Health, Safety, Environmental & Community Management Plan 2005	✓

2006 Targets
Zero fatalities
< 2
< 8
< 16
Zero fatalities
TRIFR < 9.9
Train a greater % of site team as PASS champions
Upgrade orientation and induction process
Train key ERT personnel as instructors in a number of emergency response disciplines.
DIFR < 10, TRIFR < 15
Complete PASS implementation
Complete HAZOPs for circulation and anode casting activities
Develop bow-tie risk assessments for top 10 risks
Broaden the range and number of people involved in workplace observations
Improve incident investigation quality and train people in techniques
Zero fatalities
Achieve targeted training requirements
Improve ergonomics of the ship loader cabin
Achieve an HSEC audit score of > 70

✓ Achieved ✗ Not achieved → Action continues into 2006

■ Monitoring programs

Xstrata Copper has comprehensive occupational health and hygiene monitoring programs in place across its north Queensland Division and invests more than \$500,000 a year in managing this process. Environmental sampling (workplace and personal) and biological sampling are conducted for inspirable dust, respirable dust, noise and arsenic in urine. Where sampling results identify an occupational hygiene risk above the relevant exposure standard, it is addressed immediately.

All employees complete a comprehensive health assessment before they join Xstrata Copper and health assessments are undertaken at least every four years during employment, depending on the nature of the

role being undertaken, the age and general health of the employee and the presence of pre-existing conditions. Health assessments are also conducted when employees leave the business.

A periodic health assessment system was introduced at the Townsville operations early in 2005. Sixty health assessments were completed during the year and the initial round of health assessments will be completed towards the end of 2006. As a result of these assessments, some employees have been invited to participate in health management programs which have included gym sessions and supervised exercise programs, appointments with a dietician, alternative duties, specialist reviews and medical treatment.

Caring for our people



Anode Wheel Operator Mark Corrigan wears full protective clothing while undertaking his duties at Mount Isa's Copper Smelter.



Healthy Lifestyle Advisor Julianne Lalor measures a candidate for the 'Dump your Waist' challenge as part of the Safe for Work program.

■ Working in heat

Heat stress is a risk for employees working in north Queensland and we use a range of methods to alleviate heat stress among our employees, including:

- heat management protocols (ventilation standards, dehydration testing, air-conditioned cabins and meeting areas);
- heat tolerance screening;
- occupational hygiene measurements; and
- heat stress awareness training.

Physical occupational hygiene measurements are taken, such as thermal working loads, air cooling power, humidity and temperature, and heat stress awareness and pre-shift and post-shift dehydration prevention programs are in place. With the development of the deeper 3500 copper ore body at Mount Isa in 2006, the Working in Heat Committee has been re-established. This committee comprises management representatives, ventilation engineers, workforce representatives, safety representatives and the Mines Inspectorate who meet monthly to review monitoring results, heat-related incident reports and to monitor industry advances in managing ventilation systems and heat exposure risks.

No heat-related illnesses were reported by underground employees in 2005.

■ Degenerative musculoskeletal conditions

Sprains and strains of joints and adjacent muscles are common types of musculoskeletal injuries in the workplace. We have implemented a range of measures to prevent musculoskeletal injuries and minimise degenerative conditions. These measures include risk and functional assessments, using engineering solutions wherever possible to minimise or eliminate manual handling, and training employees in correct manual handling techniques, job rotation and encouraging employees to engage in our wellbeing programs to improve their fitness for work.

The Mount Isa operations and Ernest Henry mine commenced two new projects in 2005 with the aim of reducing the impact of musculoskeletal injuries in the work environment. One project reviewed over period of time (OPT) injuries, and the other was a job role criteria project that detailed the physical, environmental and cognitive requirements of each role.

In addition to these new programs, the risk management of manual tasks project continued in 2005. Through identifying, examining and risk ranking the manual tasks that are performed in the operations, the safety, health and environment committees participating in the project were able to identify their higher-risk tasks. Separate reviews

were also conducted on new equipment purchased during the year so that required modifications could be completed prior to the equipment being commissioned. By installing measures to prevent strains and sprains at the equipment purchase phase, we prevent risks to operators for the entire life of the machine.

■ Exposure to hazardous substances

A significant study into arsenic exposure of CRL employees was undertaken in 2005. Urinary arsenic concentrations are used to monitor our employees' exposure. These levels are consistently well below the Worksafe Australia standards. Xstrata Copper is committed to reducing exposure to hazardous substances such as arsenic and therefore sought to investigate how employee exposure could be brought down to levels that are commensurate with the background population. Overall the study found no major correlations between specific activities (within group areas) and the urinary arsenic levels of employees. Furthermore, there is little correlation between the levels of inhalable arsenic in the workplace and urinary arsenic levels. The study concluded that raising the awareness of arsenic in the workplace and ensuring personal hygiene requirements and controls are enforced are critical to managing this risk.

■ Safe for work

Xstrata Copper runs a number of education and awareness programs to encourage employees and their families to maintain healthy lifestyles, optimise long-term working life and income-generating capacity and reduce short-term absences from work due to sickness. These programs address obesity, nutrition, sleep apnoea, shift work, fatigue management, alcohol abuse, smoking and mental health. We also engage external specialists such as medical practitioners, occupational health nurses and counsellors to assist our people.

During the year our health promotion campaigns linked in with state and federal health initiatives such as Quit, 10,000 Steps, Diabetes Awareness Week, Beyond Blue Depression Campaign and Lifestyle Prescription.

The Gemini Medical and Services Group continued its role at the Cloncurry Medical Centre in 2005. The Health, Safety and Training Section at Ernest Henry works collaboratively with the Gemini occupational physician and medical support personnel to provide a timely and efficient occupational health and injury management service to Ernest Henry employees and contractors. The achievements of this partnership are integral to the ongoing improvement in safety and health at the mine. These services are also available to other industries and to the general Cloncurry community.

Safety

Overcoming safety challenges

Employees at Xstrata Copper's north Queensland Division work in a wide variety of environments which present different safety hazards. The key safety challenges facing our operations are falls of ground and mobile equipment fires in the underground environment; and working with molten metals.

Our safety performance

Overall, Xstrata Copper's north Queensland Division achieved significant improvements in their safety performance in 2005, achieving most of their safety targets (see table). No fatalities were recorded during the year.

Safety performance is tracked using three measures – total recordable injury frequency rate (TRIFR), lost time injury frequency rate (LTIFR) and disabling injury frequency rate (DIFR), which record the number of injuries per million hours worked. TRIFR measures all injuries except first aid cases and includes the impact of significant injuries on employees who may be able to perform alternative duties, but not their normal function, and who would not be captured by indicators based on lost time injuries alone.

The Mount Isa copper operations achieved a 44% improvement in TRIFR and 26% improvement in LTIFR compared with 2004. Although the copper operations did not achieve their DIFR target of less than 13.3%, they did improve performance by 38% compared with 2004.

Ernest Henry achieved all of its targets for 2005, apart from its TRIFR target. Its TRIFR increased from 11.1% to 12.4% in 2005.

The Townsville operations achieved all their 2005 safety targets. CRL achieved a TRIFR of 20.4 compared with 31.1 in 2004, a decrease of 34%. Improvements in safety performance can be attributed to a greater focus on addressing safety risks, the use of the Positive Attitude Safety System (PASS), and improvements in safety training and awareness.

Identifying risks

Xstrata Copper has developed a robust and comprehensive program to identify, understand and manage safety risks across its north Queensland Division, and risk registers are regularly reviewed.

At CRL, the site risk register was reviewed in April and then again in December 2005. A process of developing bow-tie diagrams for key risks has been initiated and will continue. Bow-tie assessments are used to examine the causes that lead to a critical event and help identify the controls that will reduce the risk of such an event. In addition, the method looks at the consequences of the critical event and can also be used to identify controls to mitigate these effects. Following this review, the refinery examined the major risks in detail. As a result, aluminium cans have been banned from site as a means of managing the risk of the highly toxic arsine gas. Arsine gas can be generated in the presence of aluminium and acids that are used in the refining process.

To ensure our employees are provided with the skills they need to work safely and productively, we provide training appropriate to every role across our business. For this purpose we developed the Xstrata North Queensland Operations Training Management System. This system was implemented across all Xstrata's north Queensland operations and was recognised at the 2005 Annual Mining Industry Skills Centre Training Awards.

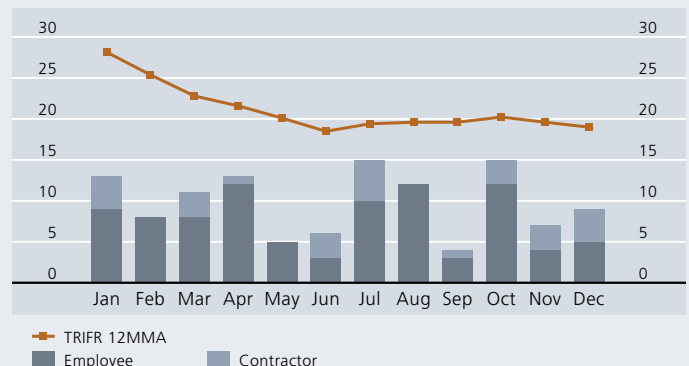


Employees of Mount Isa Copper Operations prepare to start shift.

During the year, the Townsville operations addressed its safety training requirements by mapping all tasks on site to training packages that exist for the different activities (roles and processes) on site. Once this was undertaken, activity risk assessment sessions were completed to examine the risks and determine actions that are required to reduce the risks where possible. Thirty-one sessions were completed in 2005, generally representing the higher risk activities. Sessions addressing the remaining risks will be completed in 2006. A risk assessment card system was also reinvigorated during the year. This procedure involves a quick risk assessment card being completed before any activity that is not covered by a procedure or activity risk assessment is undertaken.

Total recordable injury performance

Xstrata north Queensland Copper Operations – 2005



Xstrata's north Queensland Division operations achieved a Total Recordable Injury Frequency Rate more than 30% lower than for 2004.



DEVELOPING AWARD WINNING TRAINING

In 2005 the ore handling department at the Mount Isa copper operations invested significant time and resources to develop a training management system that would deliver nationally recognised and transportable competencies and skills.

The ore handling department's previous training system had mainly focussed on legislative compliance; its documents were not controlled and its training tools often varied in content, quality and delivery.

Through our involvement in the Mining Industry Skills Centre network meetings we were able to benchmark our performance against industry peers and we identified a significant gap between our practices and industry best practice. This was most evident in the R67 ammonia plant and the winders section, which were nominated as high risk and critical task areas.

As part of a detailed review process, each section in the ore handling department was asked to identify all the tasks that were performed for each position. This information was then transferred onto a training plan and we developed a role description for each grade structure, supported by the development of job description performance indicators.

By identifying our critical tasks and developing a task analysis and risk assessment for each task we were able to:

- improve the efficiency of the task;
- encourage employees to take a fresh look at the hazards associated with each task and provide them with the knowledge and skills to control these hazards;
- identify where additional controls were required, highlighting the need for procedures and assessment tools; and
- determine the type and level of training and assessment appropriate for each task.

The application of the Xstrata North Queensland Operations Training Management System (which supports the national competency standards) and the use of consistent forms and templates ensured our review process was sustainable and auditable.

New standards for the safe use and handling of ammonia have now been written into the R67 ammonia plant's safe operating procedures and training and assessment materials, and these standards will be submitted for inclusion in the next review of the Mining Industry Skills Centre's Metalliferous Package.

The development of assessment tools means that our winder drivers can undergo on-the-job assessment under standard mine operating conditions, which leads to increased productivity and the transportability of training across all mine sites.

The newly created electronic version of our winder driver training package enables our maintenance personnel to access reference material from remote areas at any time of day or night, thus reducing down-time and ensuring consistent maintenance standards are met. To ease learning, our upgraded training material can also be presented as a one-on-one training module or in a hands-on format.

Because our finished training and assessment model supports the introduction of new technology, such as Palm Pilots and notebook computers, we expect to create significant cost savings by reducing paper use.

The ore handling department's outstanding commitment to building a sustainable training and assessment system was recognised with a Metalliferous Employer of the Year Award at the 2005 Annual Mining Industry Skills Centre Training Awards. The quality of the Xstrata North Queensland Operations Training Management System was also acknowledged, the system winning the coveted Queensland Mining Industry Excellence in Training Award.

■ Improving safety

To assist improvement in safety performance across its north Queensland operations, Xstrata Copper has introduced the Positive Attitude Safety System (PASS). PASS is a communication tool developed to improve the flow of safety information through the workforce and to encourage safety improvement at the front line.

Employees, contractors and visitors participate in daily PASS meetings where the performance of the previous shift is rated. Both below-par performance and safety improvements are discussed in an open way that ensures that all concerned understand more about working safely. The performance of all participating groups is discussed with the most senior person on site each day and, if required, feedback and assistance is provided to ensure issues are resolved in a timely manner. The system also allows staff to consider and plan for the tasks to be completed in the coming shift and to report any hazards identified during the day and document their controls.

■ Prepared for emergency

Ernest Henry mine and Mount Isa Mines have emergency response teams consisting of employees from all areas of the operations. These dedicated employees undertake emergency response skills training in addition to their day-to-day jobs and are on standby to respond to accidents or emergencies at their mine sites.

The number of emergency response team members at Mount Isa increased during the year. Volunteers assisted with the internal competition held at the Mount Isa Hard Times mine in October 2005. The event was open to the public, and for many this was their first opportunity to see the dedication to training and commitment of the competitors first hand.

Evacuation drills were held at all three sites during the year. Points for improvement were identified and are being addressed. Updated evacuation training for wardens and responsible persons training was initiated in May 2005.



Emergency Response Teams are trained in many disciplines including accident and emergency, confined space, fire and chemical, and rope rescue.



John Beldan, Machinery Operator Xstrata Copper, Townsville Refinery, manoeuvring a tramp copper bin with the Electrodrive battery tug.

The opening of Ernest Henry Emergency Response Training Facility in 2005 provides emergency response team personnel with a designated area for the development of their skills in various emergency response techniques. These include vertical rope rescue techniques, road accident rescue procedures, fire fighting, control of hazardous chemicals and the use of self contained breathing apparatus.

At Mount Isa, work commenced on mapping the assessment packages used by the mines rescue team to the National Competency Standards MNM05 – Certificate III in Mine Emergency Response and Rescue. This will allow formal certification of this competency through the use of a third party registered training organisation.

The Xstrata Copper North Queensland Response and Recovery Plan was also developed during the year and supporting training was delivered to our key stakeholders during this process. The response and recovery plan ensures we can respond to and recover from a range of operational and reputation challenges quickly and effectively, thereby minimising the impact on our employees, operations, environment and reputation.

Award winning innovations

The introduction of site-based innovations awards in 2005 has highlighted HSEC excellence across the business. The Innovation Awards aim to encourage innovation and to develop practical workplace solutions to safety, health and operational issues at our north Queensland operations.

The 2005 award recipients were:

Mount Isa copper operations

- **Grease system trouble shooter:** Timo Metsala, a fitter in the rebuild workshop of Mine Maintenance and Engineering Services, won an award for his grease system trouble shooter. It reduces the time taken to troubleshoot faults in the grease system on a variety of underground loaders and trucks. This has resulted in a measurable reduction in down-time for equipment and has cut down significantly on the number of misdiagnoses of system faults.
- **Shotcrete cable protection:** A Certificate of Commendation was presented to Robert Van Der Veen and his D Crew in the drilling section of the copper mine for their shotcrete cable protection innovation. Their innovative idea uses current shotcrete technology to protect electrical and other services from fly rock and blast damage during underground, hardrock blasting operations.

Previous protection methods were very labour intensive, time consuming and prone to failure.

- **Waste ammonia gas decanter:** Ian Coles, Vent Fans and Ammonia Refrigeration Plant Supervisor in Ore Handling Services, received a Certificate of Commendation for his innovation in decanting waste ammonia gas from the U62 chilled water refrigeration plant. His ingenious solution ensures no ammonia contaminated water travels to the anti-pollution pond.
- **Vortex finder removal device:** The copper team, headed by Senior Metallurgist in the copper concentrator, Matt Magee, received a Certificate of Commendation for their vortex finder removal device. It allows the vortex finders to be removed using a chain block, which keeps the movement of the vortex finder controlled and eliminates the risk of back strain from manual handling.

Townsville operations

- **Duct access hatch to spray hood:** Steve Nilsson's innovation involved the introduction of rubber retaining straps to secure the hatch instead of studs and nuts. This makes opening the hatch much quicker, easier and safer, particularly as the studs often used to break off.
- **Tug:** Noel Kimlin came across a battery powered machine that can be hooked up to loads (up to 2000 kg) and used to pull the load along. When he saw the machine in a magazine he immediately recognised that it had the potential to solve a long-standing problem of moving tramp copper bins under the stripping machines. A trial machine was obtained and due to the success of the trials a new machine was purchased and introduced.
- **Audible alarm:** Mark Edgerton implemented an audible alarm with strobe light on the Kunz cranes. This alarm warns people that the crane operator is using the override function to operate the crane and to keep clear while the crane is in this operational mode.

Ernest Henry Operations

- **Group Lockout Improvement:** Alan Carmichael a Concentrator Production Supervisor at Ernest Henry mine won an award for improving the group lock out procedure and tag isolation. This is particularly useful during shutdowns where there can be numerous contractors on site. This safety improvement has assisted in 'foolproofing' the tag and lock out process during operations such as mill relining which by its nature of inch driving has been problematic in the past.



Caring for our environment

We believe that superior environmental performance results in increased efficiency, lower risk and higher overall performance of our operations and is critical in maintaining our licence to operate.

Xstrata Copper is committed to the highest standards of environmental management and performance. We limit the environmental impacts of our operations through the efficient use of natural resources and the reduction of input materials and waste, and through contributing to the conservation of biodiversity.

Overcoming challenges

Xstrata's key environmental management challenges in the North Queensland Copper Division are:

- reducing fresh water consumption through improvements in processes and management practices;
- more efficient use of energy as Mount Isa Mines' processing and smelting activities expand and mine depths, and therefore haul distances, increase;
- defining better mine closure criteria to enable effective long-term plans for progressive rehabilitation to be implemented;
- minimising emissions from the Mount Isa smelter;
- managing stormwater runoff at Mount Isa Mines; and
- implementing the groundwater remediation action plan at CRL.

Environmental compliance

Mount Isa Mines received approval for a mine plan variation submitted to the Queensland Government's Department of Natural Resources, Mines and Water. The variation related to encasing the Upper Star Gully evaporation pond with benign waste rock from the Black Star open-cut, and making improvements to the configuration of the Davidson Pond which serves as an anti-pollution pond that collects process water spills from underground wetfill operations in the event of pump malfunction.

The tailings dam inspection report and regulatory noise, dust and blast vibration monitoring reports were provided to the Environmental Protection Agency, as required by Mount Isa Mines' operating licences.

There were 10 Category 3 (significant) environmental incidents reported by Xstrata Copper at Mount Isa in 2005. All but one of these incidents were caused by tropical storm events which led to six uncontrolled stormwater releases off-site, two storage pond overflows and one uncontrolled off-site release of sewerage.

« Environmental Engineer Nick Learoyd lays fauna traps as part of a program to monitor the diversity of flora and fauna on the mine lease.

ENVIRONMENTAL PERFORMANCE

2005 Targets	Performance	2006 Targets
All copper operations in north Queensland		
Prepare a Greenhouse Challenge Agreement and complete energy audits	→ 'Energy Breakthrough Team' established for improved energy management and greenhouse reporting.	Establish Greenhouse Challenge Agreement
Mount Isa Mines		
Complete implementation of Panel Assessment Study recommendations	→ Flora and Fauna Survey and AQC Review completed	Complete Community Health and Perceptions Study
Environmental Management System to be compliant with ISO14001	→ EMS is well progressed towards compliance	Implement EMS compliant to ISO14001
Update closure planning and liability estimation	✓ Report produced	Implement Lawlex Compliance Management System
Implement total waste management strategy	✓ Waste system implemented	
		Develop surface water catchment models
		Commission Electrostatic Precipitator dust leaching plant
		Progress towards 95% capture of sulphur dioxide in the copper smelter
Ernest Henry Mining		
Complete detailed closure plan	→ Initial planning underway	Complete closure plan
Begin tailings dam rehabilitation trial	✓ Preliminary modelling for capping designs undertaken	Establishment of trial completed
Environmental Management System to be compliant with ISO14001	✓	
Raw water consumption < 520l/tonne of ore treated. Construct three additional monitoring bores	→ Required improvements were completed on tailings thickener	Raw water consumption < 520l/tonne
Review current waste rock dump designs	✓	Reuse >85% of pit dewatering water
Townsville Copper Refinery		
Audit against ISO14001	✓ An audit was conducted by an external source to measure alignment with the standard	Implement audit findings to further align with ISO14001
Develop groundwater management plan	✓ Groundwater management plan was developed and approved by the EPA	
Implement stormwater environmental management plan (SEMP)	✓ The SEMP was amended and items implemented in 2005	Implement SEMP and prepare completion report
Complete detailed closure plan	✓	Finalise site closure plan
Complete and implement groundwater remediation plan	→ Target was revised following further groundwater investigation and discussions with regulatory authority	Implement groundwater management plan
Townsville Port operations		
Implement a Dust and Water emission Reduction Strategy	✓	Complete remediation of historic sulphur contamination
Review environmental monitoring systems	✓	Complete eastern yard stormwater improvement project

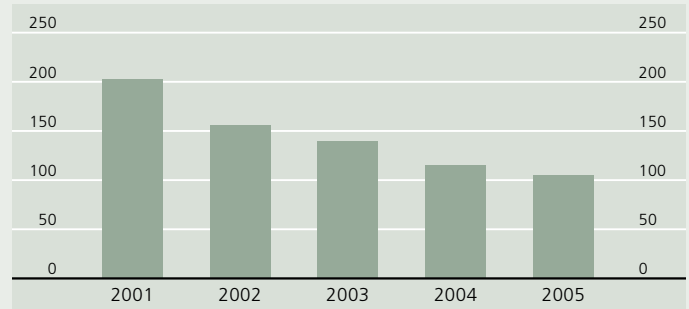
✓ Achieved ✗ Not achieved → Action continues into 2006



Graham Milligan, Environmental Sampler undertaking particulate (dust) monitoring at one of several monitoring stations located in the Mount Isa community.

Total annual sulphur dioxide emissions

Tonnes (000s) — Mount Isa Mines operations



Increased capture of copper smelter gases by the Southern Cross Fertilisers' acid plant reduced total sulphur dioxide emissions from the Mount Isa Mines operations for the fifth consecutive year.

Annual average ground level sulphur dioxide concentrations

$\mu\text{g}/\text{m}^3$ Sulphur dioxide – measured in the Mount Isa community

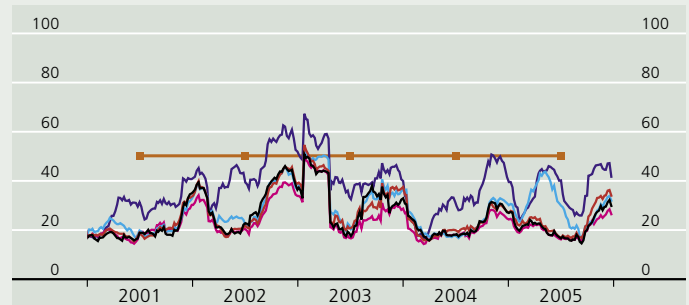


— Mount Isa Mines licence limit of $80\mu\text{g}/\text{m}^3$

Annual average ground level sulphur dioxide concentrations in the Mount Isa community remained well within the licensed limit.

Ambient PM_{10} dust-in-air concentrations

$\mu\text{g}/\text{m}^3$ PM_{10} – 90 day average measured in the Mount Isa community

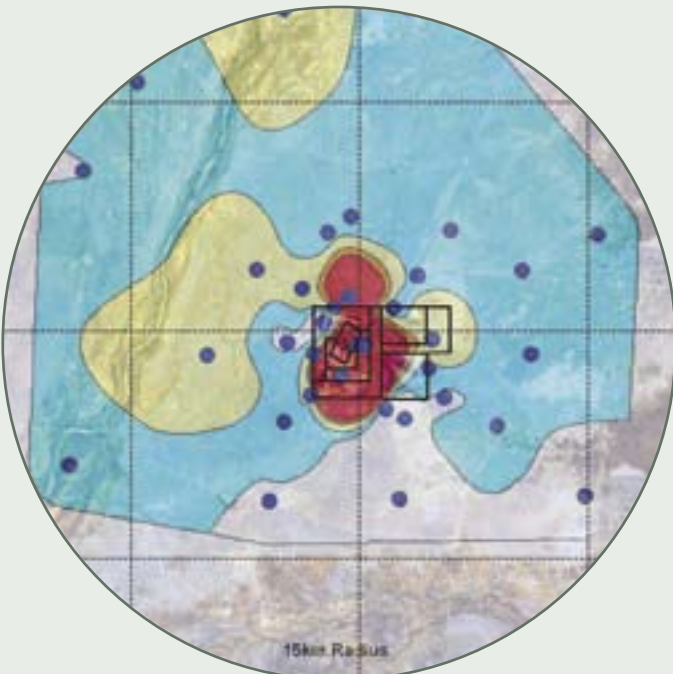


— EPP Air Standard

Monitoring Locations:

- RSL
- Miles St
- BSD
- Racecourse
- K Oval

Ambient dust (PM_{10}) concentrations measured in the Mount Isa community remained below the EPP air standard for 90 day average in 2005. The higher trend shown for the Racecourse monitor is due to localised dust rather than through mining activities.



0-20 20-40 40-80 80-120 >120

Ernest Henry Mine dust contour monitoring – total dust fallout ($\text{mg}/\text{m}^2/\text{day}$).

During 2005 Ernest Henry Mining undertook an investigation into the final void hydrology of the Ernest Henry pit. This information was submitted to the Queensland Government's Environmental Protection Agency (EPA). The EPA undertook a Level 1 3C compliance audit on EHM in September 2005 and no major non-compliances were identified. The EPA recommended investigation into additional sediment control around clay stockpiles and a sediment control fence was erected as a result.

The Townsville operations exceeded licence requirements once during the year. The CRL licence limit of 100mg/L acid mist discharge from the Scheibler Filter was marginally exceeded with a recorded value of 104mg/L during bi-annual testing.

In response to the acid mist exceeding licence requirements a series of actions were undertaken at CRL. These include altering the wash cycle of the Scheibler Filter so that compressed air flowing through the filter now passes through water instead of process liquid. Work will continue in 2006 to optimise the flow separator device on the air discharge to ensure the maximum amount of acid mist is removed from the air column.

No non-compliances were reported at the Townsville Port facility. During 2005 Xstrata implemented and reported against the Stormwater Environmental Management Program and developed a remediation action plan in response to an investigation notice at CRL. At the port a groundwater remediation strategy was developed as required by the operating licence.

Emissions to air

The monitoring, control and reduction of the impact of emissions from our mining, minerals processing and smelting operations on the community and environment of Mount Isa are a major aspect of environmental management at Xstrata's north Queensland copper operations.

In 2005 our total annual sulphur dioxide emissions fell to 105,113 tonnes, compared with 115,312 tonnes in 2004, and the annual average ground level sulphur dioxide concentrations in the Mount Isa community remained well within the licensed limit. Ambient dust (PM₁₀) concentrations in the Mount Isa community remained below the EPP air standard for 90 day average in 2005.

■ Managing emissions to air

At Mount Isa Mines, a comprehensive sulphur dioxide and dust monitoring network exists to measure and manage the impact of emissions on the community.

There are 10 sulphur dioxide real-time monitoring stations located in the community to ensure that the smelters operate within accepted regulatory limits. Each resident of Mount Isa lives no more than 1,200 metres from one of these sulphur dioxide analysers.

Overall, the copper smelter has achieved a 425,543 tonnes of sulphur dioxide per annum (80%) decrease in emissions over the 2000 baseline level. Xstrata Copper is targeting an increase from 80% to 95% capture of sulphur dioxide emissions from the Mount Isa copper smelter against the 2000 baseline level. Commencing in 2006, the program includes installing copper smelter converter hoods to capture fugitive emissions, using software to identify air entry points into the copper smelter, resulting in greater process control, improved



Air Quality Controller Glenn Farley monitors emissions and air quality readings from one of 10 sulphur dioxide monitoring stations located in Mount Isa's community from the Air Quality Control Centre.

acid plant efficiency and improving co-ordination between copper smelter and acid plant operations.

Regular watering of unsealed roads around Mount Isa Mines ensures that dust emitted by vehicle traffic is kept to a minimum.

■ Panel Assessment Study

The Panel Assessment Study was established in 1997 to assess the likely impacts of expected releases of sulphur dioxide at Mount Isa following the installation of Southern Cross Fertilizers' acid plant (formerly WMC). In particular, the study set out to identify the likely atmospheric dispersion and ultimate fate of the sulphur dioxide emissions and the likely economic, environmental and social impacts of these emissions.

The final report of the panel was submitted to the Minister for Environment in February 2001 and outlined several recommendations for further research following at least one year's operation of the acid plant at or near design production rates. While some of the recommendations have been ongoing, the remaining projects recommended by the original report were commenced in 2005 and are expected to be completed in 2006. These included:

- a flora and fauna study to look for signs of recovery in affected species;
- a community health and perceptions study;
- a personal exposure study to measure exposure of individuals to sulphur dioxide and the effects of that exposure;
- an independent review into the commercial feasibility of various process options for further emission control; and
- an investigation of ways to further improve the effectiveness of the existing air quality control system.

Caring for our environment



Mount Isa Mines tailings management system.



Paul Taylor, Environmental Advisor sampling ground bore water at the Copper Refinery site.

Managing surface and groundwater

During 2005 there were nine discharges of stormwater or process water off-site at Xstrata Copper operations Mount Isa, most due to tropical storm events. Greater ownership of discharge points is now evident and it is anticipated that this will result in significantly fewer discharges. A significant development within the Death Adder Gully catchment at Mount Isa was the construction of a stormwater dam.

At Ernest Henry mine groundwater is pumped from the mine pit to allow mining to occur and is reused in the mine's operations. To allow further development of the pit two additional 600 metre deep bores were commissioned during 2005. Groundwater levels and water quality are measured at 75 bores surrounding the mine. An additional three observation bores were constructed in 2005 to provide additional measurement sites.

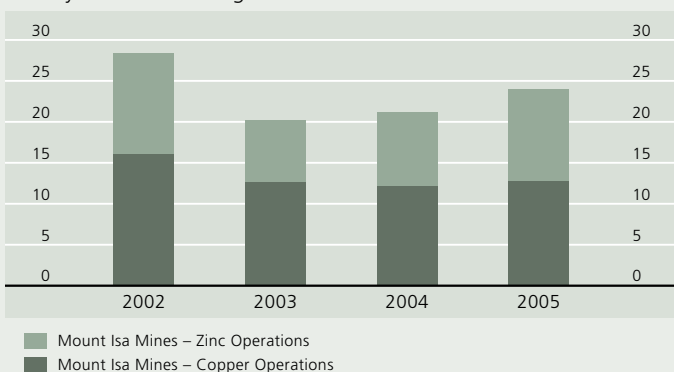
At CRL Xstrata Copper is continuing to implement its Stormwater Environmental Management Program that was agreed by the Environmental Protection Agency in December 2003. In 2005 the major action undertaken was the construction of a solid waste handling facility which stores wastes and minimises the potential for dust and subsequent contamination of soil and stormwater.

As part of its groundwater remediation action plan, CRL is installing groundwater extraction bores, planting deep rooted contaminant tolerant tree species and constructing an engineered cap over the evaporation ponds that were decommissioned in the 1980s.

In 2005 we conducted an investigation into groundwater contamination at Townsville Port. The focus of the investigation was the location of an historic sulphur dump, believed to be the cause of low pH groundwater. A plan has been devised to remove this material during 2006.

Mount Isa Mines fresh water usage

ML/day Fresh water usage



Water use

Conserving our fresh water

Fresh water is a limited commodity for our north Queensland mines. Total fresh water usage for Mount Isa Mines in 2005 was approximately 24 ML/day, up from 21 ML/day in 2004. This resulted mainly from increased production levels.

To optimise water use on site, a team was formed by the Utilities Department to:

- minimise potable water use;
- maximise water reuse from process and Rosehill Sewage Treatment Plant; and
- prevent uncontrolled losses from the system.

The project will identify:

- unrecorded water losses in the system (both unmetered use and leakage);
- processes in which recycled water can be used instead of, or in combination with, potable water, to minimise potable water use;
- alternative sources of recycled water; and
- initiatives for improved tracking and controlling water use.

The team aims to have an action plan in place by the end of April 2006 and to have controls and initiatives implemented and in place by the end of the year.

Reducing fresh water consumption

At Mount Isa Mines a cutting was constructed by the Final Products section. This will release a large volume of tailings water, which was formerly trapped in low areas of the tailings dams, making it available for reprocessing through the tailings system. This tailings water was previously not utilised and was lost through evaporation, requiring the Final Products section to top up the tailings system from the fresh water supply at significant cost.

Ernest Henry mine continued to dewater the pit from a series of dewatering bores and in-pit pumps. This water was reused in the mine as a dust suppressant and in the concentrator as a raw water supply. The use of this recycled water reduces the amount of water required from Lake Julius. Planned improvements to tailings thickeners in 2006 will increase water recycling within the concentrator. Our aim is to maintain the tailings densities being pumped to the tailings dam between 65% and 67%, which will be 4% to 6% higher than densities achieved during 2005.

At Townsville Port operations, water use was reduced by increasing the recycling of stormwater and washdown water.



case study

ENERGYSMART SCHOOLS

Xstrata funding of \$23,500 has enabled the development of an EnergySMART Schools initiative at **Ooonba State School** and **Townsville State High School**. The schools have been working together to raise students' awareness, interest and participation in science, maths and technology through Education Queensland's Centre of Excellence for Technology, Maths and Science at Townsville State High School.

The EnergySMART Schools initiative consists of an Energy Challenge component, which is aimed at increasing students' awareness of energy usage in a school environment, and a Renewable Energy Technologies project, which involves the collection, analysis and publication of information comparing the efficiencies of several renewable energy devices.

Part of the Xstrata funding has been used to install a Weather Hawk Weather Station at Ooonba State School and a Ropatech 500 watt wind turbine at the Townsville State High School.

The weather station records real-time air temperature, relative humidity, barometric pressure, rainfall, solar radiation, wind direction, wind speed, wind chill, heat index and dew point. This data is automatically sampled and recorded every five minutes and is captured on an Excel database using the Weather Hawk software. The data is stored on the school's server and students and teachers can access and manipulate

the raw data via the school's intranet. Real-time and archived weather data is also stored on the Townsville State High School's website and the school is developing a database that will allow external users, such as other schools in the region, to access this information. As well as designing challenging and complex lessons around the analysis of this data, the school is combining Weather Hawk data with data retrieved from banks of polycrystalline and amorphous solar panels at Townsville State High School to help students pursue their understanding of the relationship between solar power, environmental factors and energy smart initiatives.

Final site work is now ready to be undertaken at the front of Townsville State High School to install the Ropatech wind turbine and installation should be completed by the end of Term 1 2006. Real-time and archived data from the generator will be used by Townsville High and Ooonba Primary Schools and, following the development of a web interface, will be shared with schools around the world.

The Xstrata funding has also allowed Townsville schools to participate in plastics recycling. Townsville schools that are current customers of the council's City Waste program will be supplied with council recycling bins, and other arrangements will be made with private waste collection entities to ensure the remaining Townsville schools can also participate in plastics recycling. Xstrata will continue to support the EnergySMART initiative in 2006 and 2007.



South West Tier 1 Rehabilitation completed in September 2005 primarily made up of Mitchell and Flinders Grass.

Energy and greenhouse

■ Conserving energy takes teamwork

In 2005 Mount Isa Mines formed an **Energy Breakthrough Team** dedicated to developing energy conservation initiatives.

The goals are to reduce energy consumption and smooth out demand peaks creating a predictable energy demand; reduce the costs to plant, and develop new site projects within the existing energy budget.

The project will involve the development of an energy management system designed to give accurate feedback about consumption to plant operators, introduce new technologies such as fly wheel generation, investigate inefficiencies and identify opportunities for participating in a carbon credit system.

During 2006 Mount Isa Mines will also develop an agreement with the Federal Government to become part of the **Greenhouse Challenge Plus**. By doing so, Mount Isa Mines will be committing to identifying opportunities and implementing action plans to abate greenhouse gas generation from its operations. The Energy Breakthrough Team will be fundamental in supporting these activities.

Through our Xstrata Community Partnership Program North Queensland we are supporting energy saving projects in local schools, helping spread the sustainability message to students, their families and the wider community (see case study).

■ Producing emission-free electricity

In mid-2005 the Mount Isa copper operations successfully recommissioned the Pelton Wheel, allowing the copper mine to generate emission-free electricity. The process involves high-pressure water under gravity force passing through a nozzle in the Pelton turbine, which moves 22 buckets fitted on spokes that are equally spaced around a wheel (known as the Pelton Wheel) as it is sent underground. As the wheel turns it rotates a shaft that is directly coupled to an electrical generator, reducing the temperature of the water to 2.25°C and generating 1MW at 11,000 volts. The electricity is generated without the emission of any further greenhouse gases.

Biodiversity

An aquatic ecosystem monitoring program in the Mount Isa region is providing Xstrata with a measure of the current biodiversity of water bodies located within the region. The program monitors fish and macro-invertebrates during both the wet and dry seasons. The fish monitoring component of the program was conducted by the Queensland Department of Primary Industries and Fisheries, using electrofishing techniques to collect and sample fish from Rifle Creek, Lake Julius, Lake Moondarra and the Leichhardt River. To measure the diversity of the macro habitat, macro-invertebrate sampling was conducted in accordance with the Queensland AusRivAs sampling techniques. Information gathered from this program will be utilised by Xstrata to form a regular aquatic ecosystem monitoring program and will contribute significantly to other biodiversity projects currently being undertaken.

In 2005 Ernest Henry Mining continued to undertake aquatic ecological health assessments at downstream locations from the mine. This included the sampling and analysis of freshwater mussels, sediments and water quality in Gypsy Creek and at selected control sites in the Cloncurry region. Results indicated that the ecological health of the downstream locations has not deteriorated since the establishment of Ernest Henry mine.

In 2005 terrestrial fauna surveys were also undertaken. These surveys identified many species, both at the Ernest Henry rehabilitation trial site and at off-site reference areas. Species identified at the rehabilitation site included the stripe-faced dunnart, long-tailed planigale, Eyrean earless dragon and many others.



Long-tailed Planigale.

Safe mine closure and rehabilitation

In 2005 Xstrata completed materials characterisation on run-of-mine waste rock from the Black Star open-cut mine at Mount Isa. This information will be combined with materials data collected from final mined landforms and mathematical modelling will assess the technical feasibility of using run-of-mine material to construct a final moisture store and release cover. The objective of final cover is to minimise the infiltration of rainfall through the mined material, preventing the generation of leachate of environmental significance.

In 2006, once final cover thicknesses have been determined, engineers will be able to plan the movement of benign waste rock to close historic final mined landforms.

A revision of the current closure estimation was completed in 2005 with improvements made in estimation approaches. These were made through refinements to closure criteria of tailings dams and other final mined landforms. There are however some remaining assumptions that require additional assessment.

In 2005, Xstrata continued to actively rehabilitate available areas on waste rock dumps at Ernest Henry mine. Approximately 15 hectares was rehabilitated on tier one berms on both the north and southern waste rock dumps.

An investigation into the final void hydrology of the Ernest Henry pit was also undertaken to assess final void water quality, equilibrium water level, the rate of recharge of the pit and the risk of discharge from the pit once equilibrium is achieved. Initial modelling suggests that the water quality of the pit water will be well within stock water drinking guidelines and could potentially be a significant water resource after closure. The study indicated that there was no risk of overtopping.

In 2005 investigations were undertaken into capping designs for the tailings dams at Ernest Henry. This project has involved the analysis of the hydrological characteristics of cover materials. The approved 2005 designs will be constructed as trials on a small section of the tailings dam.



Members of Mount Isa's Environmental team meet to map out environmental rehabilitation on the lease.

Managing waste

In 2005 a total waste management system was established that enabled Mount Isa Mines to manage waste generated on site to industry best practice standard. All waste streams are tracked, allowing better separation and recovery of scrap metal. Each month about 3,000 cubic metres of general waste and 100 tonnes of scrap metal are collected. An additional 15 to 20 tonnes of scrap metal that would otherwise have been buried are also recovered from the landfill each month.

At Mount Isa demolition began on the fluo solids roaster (FSR) which was decommissioned in 1997 after almost 30 years of service. Previously, the FSR formed the initial stages of the copper smelter process but it became redundant after the commissioning of the ISASMELT. Demolition of the FSR is expected to be completed by early 2006. It is estimated that more than 3,500 tonnes of steel will be recovered for recycling.

Since 2000 Ernest Henry mine tyre life has been improved by more than 150% to more than 5,000 hours per tyre. This is due to several initiatives including better knowledge of tyre management, clearing rocks from roads and around shovels, improved and better maintained roads, and sheeting windrows to minimise side wall damage to tyres. These improvements are significant considering the worldwide shortage of tyres used in large scale mining.

Xstrata Copper began construction of a solid waste handling facility at CRL in September 2005. The facility was designed to centralise and better manage the handling of wastes and other materials that have the potential to generate dust and impact on stormwater quality. The facility forms part of CRL's Stormwater Environmental Management Plan, and it is believed that monitoring through 2006 will confirm improvements in stormwater quality as a result of this project.



Light gauge scrap metal being compacted into bales for transport to the recycling facility.



Caring for our community

Xstrata Copper believes that the wellbeing of our employees, their families and the communities in which we operate is crucial to maintaining our social licence to operate our business.

While recognising the need for ongoing development of the skills of current and potential employees in north Queensland, we acknowledge that enterprise and job creation is just one part of the success equation.

Our ongoing funding of educational, environmental, social, community, health, arts and cultural initiatives is also a key part of our social responsibility.

The development of the Xstrata Community Partnership Program North Queensland is the cornerstone of our commitment to engaging with local communities and fostering opportunities to ensure their wellbeing.

Xstrata Community Partnership Program North Queensland



XSTRATA COMMUNITY PARTNERSHIP PROGRAM

The Xstrata Community Partnership Program North Queensland, launched in December 2004, is contributing more than \$4 million over three years to vital community initiatives. In addition, it was announced in March 2006 that the program's 2006 funding would be increased to \$1.22 million.

The program provides support within six key areas in response to the needs and issues of our community and in keeping with Xstrata's Corporate Social Involvement policy and guidelines.

Our initiatives focus on the following areas:

- enterprise and job creation;
- education;
- environment;
- social and community;
- health; and
- arts and culture.

We seek to actively promote partnerships with the communities; training, welfare and education organisations; and state and local governments, for the betterment of our community. The Xstrata Community Partnership Program North Queensland will continue to build on its many successes in 2006. The following is an overview of the progress of selected north Queensland partnership programs during 2005:

« Centacare Training Manager Brad Eggmolesse takes trainees Allen Punch and Peter Dempsey underground in a program designed to prepare people for working in the mining industry. In partnership with Xstrata Centacare employment has expanded its indigenous employment initiative to improve opportunities for indigenous job seekers within the mining industry.



Student Madison Smith with teacher Sally Kapernick learning on one of the networked computers as part of the Cloncurry computer cabling rollout at Cloncurry State School, one of Xstrata's Community Partners.



Xstrata Community Relations Officer, Avril Plath join Delta Dog Adonis and his handler Alison Brennan on a visit to Emma Keyes at the Townsville Hospital Children's Ward.

SOCIAL RESPONSIBILITY PERFORMANCE

2005 Targets	Performance
All copper operations in north Queensland	
Achieve Xstrata Community Partnership Program in north Queensland objectives	✓
Publish site sustainability reports	✓
Conduct community attitude survey in Mount Isa, Cloncurry, Townsville and Bowen	✓

✓ Achieved ✗ Not achieved → Action continues into 2006

2006 Targets
Continue to expand the benefits of the Xstrata Community Partnership Program in north Queensland
Publish site sustainability reports in 2006
Continue implementation of initiatives arising from the 2005 community attitude survey

Enterprise and job creation

We aim to create a fair and supportive workplace, to foster the skills of current and future employees, and to address the skills shortage in the region through a raft of initiatives. Our apprenticeship program, school-based workplace training, graduate recruitment and development, vacation employment, and scholarship programs are vital for building a stable workforce that will grow in line with Xstrata's long-term sustainable business strategies.

■ Supporting apprentices and trainees

At Mount Isa Mines we created 72 new apprenticeships in 2006, with a further 70 apprentices to commence in 2007, a significant increase compared with the 2005 intake of 59 apprentices. Four new apprenticeships were offered at Ernest Henry Mining, in the areas of electrical, diesel fitting and mechanical fitting.

Through our work experience program, 20 school students completed at least one week of work experience at Mount Isa Mines during 2005, and Ernest Henry Mining made available structured work placement to five students from Cloncurry and Charters Towers schools.

As part of the Xstrata scholarship program we granted scholarships to 10 north Queensland high school students during the year and three of these students undertook work experience at Mount Isa Mines.

We are also a major employer of university graduates, with 42 university graduates recruited in 2005 and 41 university students choosing Xstrata for vacation employment.

Education

■ Supporting school students

Through our partnership with Mount Isa's **Spinifex State College** and **Good Shepherd Catholic College**, we awarded 14 students with school-based bursaries at the beginning of 2005. A further 14 bursaries were presented in November 2005, to be used for the 2006 school year. The school-based bursary program enables young people in our community to experience work in the mining industry as well as offering practical financial assistance in the final high school years.

The program starts with students in Year 8 and Year 9 being introduced to the mining industry. Work experience begins in Year 10 and involves:

- a work shadowing program where students spend time in up to five work areas;
- an on-the-job work experience program of two to six weeks at work, plus one day a week at TAFE for job competency training; and
- mentoring and career guidance.

Work experience continues in Year 11 and Year 12 with the aim of signing up students into school-based apprenticeships or traineeships. In 2005, 80 students joined Xstrata's workplace training program, which was expanded to include **Cloncurry State High School**.



Teacher Aide Carlene Parker works with Townview State School students in the new Multimedia Learning Development Centre. The new Centre is helping students and teachers to learn a range of technological and IT skills.

■ High tech learning

The Xstrata Community Partnership Program provided \$160,000 in funding over three years to the **Townview State School Multimedia Learning Development Centre** in Mount Isa, which opened its doors to students and teachers in 2005. Students had the opportunity to showcase their first major multimedia production in August 2005 at the school's anniversary dinner.

The **Future Classroom** at the **Spinifex State College** in Mount Isa is up and running, with impressive state-of-the-art digital equipment offering students the chance to learn about multimedia in a comfortable and modern learning environment. In addition to setting up the Future Classroom, Xstrata's \$250,000 in funding over three years has allowed Spinifex State College to start a school-based program to assist students at risk of disengaging from the education system. There were 55 students enrolled in the program in 2005 and a further 31 students are enrolled in 2006. The program incorporates an alternative curriculum that includes a range of community-based agencies and organisations, such as TAFE, Arilla Paper, Turning Point, Outback Arts and the Police Citizens Youth Club (PCYC).

The **Cloncurry State School** is now connected to the internet, giving school students access to the latest information technology. In 2005 Xstrata provided \$46,000 for the purchase of computers and cabling to connect the classrooms, with a further \$40,000 of funding going to the school in 2006 and 2007 to continue upgrading the school's computers and systems.

Social and community

■ Fostering life skills

Our involvement, in partnership with the Mount Isa Community Development Association, in the **Mount Isa Home Skills Support Development Project** has the long term goal of providing education and training programs and other important life skills services to tenants in the community.

Our funding enabled the association to successfully complete its first phase undertaking of a needs analysis survey of clients in the Community Rent Scheme and Community Housing Program. The survey was undertaken by newly appointed Coordinator, Lydia Gah-Bell, and identified and investigated issues (such as ethnicity, language, education needs, income sources and the financial situation of clients) that may be contributing to problems being experienced by clients of these community programs. Using this survey data, the home skills project will develop relevant education and training resource materials to support clients' training needs in 2006.

Because of the importance of this work in the Mount Isa community, Xstrata has agreed to increase funding for this project, with the possibility of expanding the project to ensure it meets its short-term objectives and long-term goals.

■ Assisting children and youth

A telephone survey conducted by Xstrata in 2005 identified the critical need for a Cloncurry-based indigenous youth worker. Funding from Xstrata in 2005 has fostered the development of a partnership between the **Cloncurry Police Citizens Youth Club** and the **Cloncurry Youth Centre Inc** and the employment of an indigenous youth worker.

The PCYC and Youth Centre share premises and staffing and the Xstrata funding, which will continue into 2006 and 2007, allows the youth centre to open at regular hours and be staffed by qualified youth workers. The youth workers are able to share their skills by working closely with other youth services in Cloncurry.

Xstrata's \$60,000 contribution to **Centacare Mount Isa**, provided over three years, has allowed this welfare organisation to conduct support programs for children who are in care, are victims of sexual abuse, domestic violence, or are living in less than ideal family situations. Since their commencement in 2005, these valuable support programs have been offered to numerous groups of four to six children.



Home Skills Project Coordinator Lydia Gah-Bell with participants of the Home Skills Project, Athol Walden and Catherine Walden.



Diabetes Health worker Marg Body treats client Lester Booth at the Diabetes Health Centre – a partnership between Queensland Health and Xstrata as part of the Xstrata Community Partnership Program North Queensland.

Health

■ Battling diabetes

In partnership with Queensland Health, Xstrata provided \$150,000 over three years to establish the **Diabetes Centre at Mount Isa Hospital**. Diabetes is a growing problem in our community and the new centre is providing consistent, modern diabetes management while encouraging client autonomy and self-care through a timely, publicly accessible service.

■ More medicos

The Xstrata Community Partnership Program North Queensland is funding \$245,000 over three years (from 2005) to provide more doctors for Cloncurry. This initiative was prompted by a critical shortage of doctors in Cloncurry in late 2004.

The funding has enabled **Gemini Medical Services** to expand their medical practice to not only service EHM employees, but the whole community. The community now has access to an alternative general practice provider. This increase in the number of general practitioners in Cloncurry has also eased the pressure on the "on call" suite of doctors at Cloncurry Hospital.

■ Life saving equipment

An Xstrata grant of \$16,500 helped the **Townsville Hospital Foundation** purchase a **defibrillator** for the Queensland Rescue Helicopter. This equipment came into service in early August 2005. The defibrillator is used during the retrieval and transfer of critical patients and can monitor heart rate, blood pressure and oxygen saturation levels. The potentially life saving machine can also be used to help restore a patient's heartbeat to a normal rhythm. In 2005 the Queensland Rescue Helicopter undertook more than 360 retrievals.

Arts and culture

■ Playing with music

In 2005 Xstrata and the **Queensland Arts Council (QAC)** joined forces to bring an exciting musical theatre event to Mount Isa and Cloncurry. The play, *Voices*, with music by Mary Morris, was based on the movie *Paradise Road*, a World War II drama about a vocal orchestra started by a group of women imprisoned in labour camps by the Japanese. The *Voices* production brought in a team of professional performers to work with women and children in the region. The performances were well attended and participants gained the opportunity to develop their performance and professional production skills.

In another very successful partnership with the QAC, regional arts forums were held in Mount Isa and Bowen. The forums connected a broad cross section of volunteer and professional arts workers, local government councillors, mayors and staff, as well as practising artists and representatives from the QAC and Arts Queensland. Discussion topics encompassed the themes of isolation, access, partnerships and the effective use of resources. The forums were very well attended and prompted extremely positive feedback from all participants.

During 2006 and 2007 Xstrata will provide ongoing funding for QAC projects in north Queensland communities, a commitment totalling \$225,000 over three years.

■ Acting Up

In partnership with Lifeline, Xstrata funding of \$35,000 enabled 15 young people, with very limited drama skills and knowledge, to participate in the **Acting Up** project. Through their attendance at regular intensive workshops, the participants learned to value themselves and their peers, to be comfortable sharing their ideas and thoughts and to overcome challenging behaviours. They put their ideas on paper, rehearsed hard and the outcome was a play of high quality. Commitment from parents played a vital role in the outcome of the program. Ten performances were given, five to schools and five to the general public. It is hoped that the young people's inspiring performances and genuine passion for their new-found talent will encourage more young people to become involved in drama, particularly in the Acting Up program which will again run in 2006.

DONATIONS AND SPONSORSHIPS

In addition to the Xstrata Community Partnership Program in north Queensland, Xstrata spent more than \$460,000 in 2005 on sponsorships, donations and other community support initiatives.

In Mount Isa, major sponsorship was provided to the Mount Isa Rotary Rodeo, the Outback at Isa tourism attraction and the Mount Isa Mining Expo.

In Cloncurry, Xstrata was a major sponsor of the Cloncurry Merry Muster, the Cloncurry Stockman's Challenge, the Cloncurry and District Agricultural Show and the Cloncurry Arts Council.

More than \$15,450 was provided to support a diverse range of events and initiatives in Townsville.



Xstrata Community Relations Officer, Avril Plath meets with Wulguru resident, Keryn Thompson.

COMMUNITY ENGAGEMENT AND COMMUNICATION

As an integral part of the local community, we like to keep abreast of relevant regional issues and to share clear, open and honest information on Xstrata's activities in north Queensland with employees, contractors, stakeholders, local organisations, community members, visitors and other interested parties.

Methods used for disseminating this information in 2005 were:

- three community information sessions to share information on Xstrata's operations and allow questions from community members;
- holding regular meetings with key local stakeholders to discuss emerging issues, facilitate cooperation between the company and the community and resolve any issues;
- celebrating with long-term employees at anniversary dinners that commemorated 20, 30 and 40 years of service;
- keeping in regular contact with partners in the Xstrata Community Partnership Program to discuss the progress of programs and offer advice and assistance when sought;
- conducting regular surface tours of Mount Isa Mines and Ernest Henry mine, run in conjunction with community tourism organisations;
- representation on local committees and membership of community development organisations;
- company newsletters that are produced by Mount Isa Mines, Ernest Henry and the Townsville operations and delivered to staff and members of the local communities; and
- completing the first Xstrata North Queensland Sustainability Report in 2005 for distribution throughout the north Queensland communities in which we operate.

Mount Isa community complaints		
No.	Description	Action taken
66	Sulphur dioxide levels in the community	Complainants advised of AQC status and any action being taken
1	Resident's fence collapsed after work on adjacent greenbelt project	Re-erected the complainant's fence

Listening to feedback

To gain vital feedback, in May 2005 we carried out a community attitudes survey in the north Queensland communities of Mount Isa, Cloncurry, Townsville and Bowen where we operate and where our employees and their families live.

Residents were surveyed on their views about the major issues facing Xstrata and the local communities, including their opinions on environmental issues, community support programs and the dissemination of information from Xstrata.

The survey has enabled Xstrata to develop an action plan to address issues of concern to the community.

Surveyed Mount Isa residents felt employment issues and the long-term future of Mount Isa Mines were the two biggest issues facing the local community. Xstrata is addressing these issues through its Xstrata Community Partnership Program and through plans to potentially extend the life of Mount Isa Mines by conducting further exploration and investigating other third party arrangements.

In Cloncurry, youth issues were the most pressing social concern, and Xstrata is tackling this problem through several Community Partnership Program initiatives including the funding of a youth worker.

Townsville residents said a lack of employment opportunities in the region was one of their biggest concerns. Xstrata is helping address the issue of employment opportunities through its Community Partnership Program North Queensland by supporting innovative programs in local schools and providing more training and apprenticeship opportunities to young people in north Queensland.

A follow-up survey will be conducted in 2007 to allow Xstrata to determine where our efforts have been successful and identify any areas where extra action may be needed.

Handling complaints and enquiries

Mount Isa Mines operates a 24-hour community information telephone line from its Air Quality Control (AQC) centre to manage complaints and enquiries and to provide feedback to callers. The centre monitors ambient sulphur dioxide levels in the town and directs operations at Mount Isa Mines' smelters and Southern Cross Fertilizers acid plant.

In 2005 the number of complaints received by Mount Isa Mines fell by 40%. All complaints are handled by community relations advisers and complainants are responded to promptly. Most commonly, Mount Isa complaints are associated with sulphur dioxide emissions and callers are advised of current AQC status. To control sulphur dioxide levels in town Xstrata reduced its copper smelting operations by 1250 hours in 2005.

Ernest Henry Mining received one complaint in 2005 relating to blast overpressure at Cotswold Station. This incident was investigated and found to have been caused by a cloud inversion layer that reflected the pressure of a blast and caused it to travel to a station house 14 kilometres away.

Glossary

AQC – Air Quality Control centre

The centre monitors sulphur dioxide emissions and weather conditions and directs the operations of the Mount Isa Mines smelters to control sulphur dioxide concentrations within license limits.

Biodiversity

An abbreviation of “biological diversity” that means the variability among living organisms from all sources, including land based and aquatic ecosystems of which they are a part. These include diversity within species, and of ecosystems.

Closure Plan

A formal document detailing a costed conceptual outline of how the operation will be closed, taking into account the options available to deal with prevailing social and environmental issues.

DI – Disabling Injury

Calculated as lost time injuries plus restricted work injuries (LTI + RWI).

DIFR – Disabling Injury Frequency Rate

Disabling injury frequency rate = $DI \times 1,000,000/\text{hours worked}$.

EMS

Environmental Management Systems.

EPA

Environmental Protection Agency.

EPP air goal

Maximum levels for air quality indicators to be progressively achieved as part of achieving overall Environmental Protection Policy objectives.

Fatality

A death resulting from an occupational injury or disease/illness and identified within the reporting period.

Gj

Gigajoules (a thousand million joules).

Greenhouse gas

Any gas that absorbs infra-red radiation in the atmosphere, causing the warming of the earth's atmosphere.

HSEC

Health, safety, environment and community.

ISO

International Standardisation Organisation.

ISO14001

The International Standardisation Organisation's standard for environmental management systems.

LTI – Lost Time Injury

An occupational injury or disease that results in days away from work on any rostered shift subsequent to that on which the injury occurred. A fatality is also recorded as an LTI.

LTIFR – Lost Time Injury Frequency Rate

Lost time injury frequency Rate = $LTI \times 1,000,000/\text{hours worked}$.

ML

Megalitres (1 megalitre = 1,000,000 litres or 1,000 kilolitres).

µg/dl

Micrograms per decilitre.

µg/m²/day

Micrograms per square metre per day.

NOHSEC

National Occupational Health and Safety Commission.

Particulate emissions

Controlled discharges from stacks containing microscopic solids in the form of dust or smoke.

PAS

The Panel Assessment Study into the impact of sulphur dioxide emissions from the Mount Isa Mines smelters – established by Mount Isa Mines in cooperation with the Queensland EPA in 1997.

PASS

Positive Attitude Safety System.

PM₁₀

Particulate matter less than 10 microns in size.

Raw water

Untreated water extracted from groundwater, dams or rivers.

Recycled water

Recycled water is water:

- that has been used at least once in a process within the operation or at another operation; and
- that would otherwise be part of a waste stream; and
- if not re-used, would require the input of raw water.

Rehabilitation

In this report, rehabilitation is defined as disturbed areas that have been prepared for rehabilitation and seeded.

RWI – Restricted Work Injury

An occupational injury or disease that results in a person being physically or mentally unable to perform all or any part of his/her normal assignment during any rostered shift subsequent to that on which the event occurred.

Social Involvement Plan

A plan produced by each Xstrata commodity business to set out engagement with local communities detailing the range of initiatives to be undertaken and the resources, financial and otherwise, dedicated to this area of the business.

Tailings and tailings dams

The fine fraction of waste rock remaining after the mining and on-site processing of mineral resources. This consists of finely ground particles and traces of process reagents and chemical residues. Tailings are piped into engineered impoundments known as tailings dams, which are developed, operated, monitored and maintained to prevent seepage and water contamination both during and after mining operations.

TRI – Total Recordable Injuries

A measure that includes:

- lost time injuries (including fatalities)
- restricted work injuries (RWI); and
- medical treatment injuries (MTI).

TRIFR – Total Recordable Injury Frequency Rate

Total recordable injury frequency rate = $(LTI + RWI + MTI) \times 1,000,000/\text{hours worked}$.



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