

## Mining and the environmental agenda

*Tracey Khanna, Assistant Editor of UK's Mining Magazine discusses some of the new and important environmental challenges, physical and social, that are facing mining companies.*

The tide of public opinion has turned strongly against those companies which are unable to show that they are practising responsible environmental stewardship. This is, no doubt, in part due to the recent focus of the international media on environmental issues and constantly improving means of communications, which has brought the whole subject of mining and the environment to those who, in the past, had only a limited awareness of the industry.

Mining companies today face new and important challenges with regard to the environment, both physical and social. New technology and a greater understanding of waste management techniques has helped to bring about improved handling and disposal of mines wastes, so reducing some of the impacts. However, improved technology has also brought about the economic viability of exploiting increasingly lower-grade ore from open pits, resulting in a greater visual impact.

Another challenge facing the industry is the successful integration of community issues with the management of a mining project. Community consultation is rapidly becoming an essential and accepted part of the development process. In addition, corporate reporting is also essential in showing commitment to good environmental stewardship and for the public's trust to be restored in the industry, corporate attitudes to the disclosure of certain information need to change.

Pressure on the mining industry to comply with, and put into force, 'good environmental practice' has never been stronger. There are a number of bodies influencing mining companies as they come to terms with the new requirements:

- ▶ Environmental pressure groups, (NGOs) such as Minewatch, Greenpeace, Friends of the Earth and Mineral Policy Centre, which have a generally negative attitude to mining
- ▶ Non-governmental organizations such as the World Bank, the United Nations Environmental Programme and the International Council on Metals and the Environment, which are all providing the industry with guidelines to follow
- ▶ National governments which are responsible for establishing legislation and ensuring compliance

- ▶ Mining associations which are assisting members to improve environmental, social and economic performance. The implication behind the 'codes of practice' is that corporate peer pressure is enough to encourage members to comply voluntarily; and
- ▶ The international media, whose coverage of 'mining disaster' can be intense, and can bring such news very quickly to the attention of the general public who gain most, or all, of their knowledge about a company, mine or event by reading newspapers, magazines or journals, watching television or 'surfing' the Internet.

### Technical advances

How far has the improvement of existing techniques and the development of new technology aided the environment? Advances in technology are inevitable in response to:

- ▶ Higher global mineral consumption patterns, which drive the need for increased production; and
- ▶ The downward trend in market prices, which forces producers to lower operating costs.

The actual recovery of metal from ore is constantly improving, resulting in less metal being present in the waste material, thereby reducing the impact of heavy metals that are being released into the environment. Methods to improve the use of process chemicals and to change those used, where possible, to less environmentally harmful alternatives, and to increase recycling are also being developed.

Bioleaching is currently commanding attention as it is applicable for both sulphidic and non-sulphidic ores and concentrates. The process not only has potential for metal recovery, but also for the detoxification of industrial waste products, sewage sludge and soil contaminated with heavy metals. The *in situ* leaching of ores to extract minerals is another area that is currently being investigated, with a small number of projects already using the process. However, there are still many concerns about the environmental implications.

Hydrometallurgy is being developed as a process to solve the environmental problems associated with smelters. It is predicted that there will be a major change in the coming years towards the use of pressure leaching by the copper industry, which will help alleviate the pollution problems of SO<sub>2</sub> production.

Amid the current climate of concern about the risks of using cyanide in gold recovery, a new 'environmentally friendly' technology is emerging. The Haber Gold Process (HGP) was first developed in the 1980s by Haber Inc., a US-based chemical company. The process follows the conventional route of crushing and grinding the ore before mixing with water to form a slurry to pump to the leach tanks. It is just prior to leaching that Haber's patented reagent suite is added. The gold in solution can be recovered using activated carbon followed by electrowinning, and the acidic tailings are neutralized before disposal. Pre-treatment is apparently only necessary for certain refractory ores, including sulphide and telluride ores.

## Green Topics—Mining and the environmental agenda

One of the biggest challenges facing the international extractive industry is the handling and disposal of waste material. As lower grade open pit deposits are exploited, the ratio of waste generated in relation to the quantity of mineral produced rises substantially. Management of waste rock and tailings are the most significant physical environmental concern for an operation. Waste dumps need to be designed and carefully managed to ensure that they are not a permanent scar on the landscape, that water run-off is kept to a minimum, that drainage does not contain elevated levels of heavy metals, and that potential acid-producing material is successfully encapsulated.

The discharge of tailings into an impoundment requires similar care and attention, with the additional problem of water/supernatant management and the final dewatering of the facility of rehabilitation. Failure of tailings impoundments can have a severe adverse impact not only on the environment itself, but also on a company's reputation, as tailings disasters often gain the full attention of the media, pressure groups and NGOs. It is in response to these fears that tailings management systems are being improved. Paste technology and subaqueous disposal are just two of the options helping to reduce the risk.

However, whilst improvements in technology are indeed reducing the impacts of mining on the environment, improved technology can also have a detrimental effect on the environment. With the technology to mine and process ever-lower grade ores by bulk mining methods (in particular, surface, open pit mining), visual impacts on the landscape from the pits and waste dumps, pollution from ore processing and increased tonnages of tailings to be disposed of are becoming ever more problematic. And whilst new and improved technologies are undoubtedly helping reduce risks at large-scale operations, high initial start-up costs and the need for technical knowledge and assistance are prohibitive for small-scale and artisanal mining operations, where the greater environmental damage often occurs.

### Planning for mine closure

Most people will accept, even if only grudgingly, that mining is an essential industrial activity that underpins industrial development. Moreover, mining is a unique industry in that direct relocation is not possible—mineral deposits, clearly, cannot be moved to less sensitive locations. Words such as sustainability and environmental accounting are increasingly being used in relation to mining, but with limited meaning. On the one hand, mining is inherently activity, as it leaves a mineral resource depleted and often nothing in its place. On the other hand, giving a tangible value to the environment is an almost impossible task, and comparing that value with the financial gains a mining company can bring, especially to developing countries, results in mining normally gaining the advantage over the environment.

If industry and governments work together to bring long-term development to an area, financed by taxes and royalties from a mining operation, then overall sustainable development that will continue after a project closes can be

achieved. In addition, if a mine site is properly managed, and rehabilitation after decommissioning is in keeping with the local ecosystem, then the cost to the environment can be minimized.

To achieve these ideals, the financial costs of environmental and social protection have to be integrated into a business plan from the start, and this is a trend that is gaining acceptance (*MM*, July 1999, p.1). Industry appears to be realizing that the proactive approach is best, and that total costs are much less if environmental issues are assessed and dealt with at the start of a project, rather than sorting out the mess after a mine has closed. However, there are many who believe that companies are not being required to put sufficient funding aside. The current downward trend in the mineral market is also causing concern, with some groups arguing that the increased number of mine closures and financial difficulties facing some companies will leave the public at risk of having to assume closure costs (*MEM*, March 1999, pp. 10–13).

### Public perception and community issues

Companies are coming to the realization that public perception and expectations are challenging corporate strategy. Whereas in the past, commercial rationale was sufficient to justify a business decision, in today's climate, these decisions no longer go unchallenged. As already mentioned, the inherent severe visual impact of open pit mining, for example, has been a strong factor in influencing public perception that mining is simply destructive.

In remote areas, the need for new development brings about a short-term fix to social and economic problems. New development in an area that lacks established industry and has little or no infrastructure can result in a mine-dependent society. However, when a mine closes, what then of the dependent community? In the past, companies often simply closed down and moved out. Current perception, however, dictates that companies are in part responsible for the well-being of a community when mining is no longer able to support it, and the public is beginning to demand that industry helps societies to build on the legacy it leaves behind.

It is partly in response to this public pressure that companies have found that they have to move away from the traditional use of public relations towards community consultation. Until fairly recently, the general trend was for companies to focus primarily on the project and only secondarily on the community. Companies adopted public relations to try to *sell* the project to the communities. The trend is now for community consultation techniques to be used to *develop* the project in harmony with those who face the greatest impact. One of the greater challenges facing the mining industry is the successful integration of community issues with the broader management of mining projects. Whilst technically robust approaches to managing the environmental aspects of mining are well developed, socio-economic issues related to mining still present many challenges to mining companies, governments, NGOs and environmental groups alike.

## Green Topics—Mining and the environmental agenda

Whilst the most appropriate time for a mining company to establish a relationship with the local community is during exploration, the experienced company negotiators required (essential to the success of any community consultation process) are rarely part of the initial teams. Forging trust at the beginning of a project sets the scene for a long-term, mutually beneficial relationship. If, on the other hand, consultation starts too late, or even after operations have already commenced, conflict may already be too deep to be resolved easily.

The importance of Social Impact Assessments (SIAs) cannot be overlooked. Mining companies must adopt a more active role in the process of community consultation and should learn to be proactive instead of reactive. An essential method of engaging stakeholder dialogue is to use independent facilities who are not tied to the outcome. From a company perspective, preventing negative social impact is far preferable to dealing with problems retroactively in a climate of acrimony, litigation and public opposition.

SIAs have, until fairly recently, been seen as a small part of the general Environmental Impact Assessment, an already well-established part of project development. However, many are now beginning to see SIAs as having the potential, as a process in its own right, to identify and predict, mitigate, and monitor and manage any likely or unanticipated social impacts of the project. Nevertheless, there are criticisms of SIAs, the main contention being that even with a best practice, integrative approach, not all impacts can be forecast. Therefore, the process must be seen as ongoing, involving continual monitoring and evaluation.

### Corporate reporting

Corporate reporting is the end product that reflects corporate attitudes to environmental issues. There are many reasons why companies should make this information public. An emerging issue is that financial analysts are now beginning to look closely at a company's environmental performance and future liabilities (for example, hitherto unaccounted for reclamation commitments) may well affect a company's share price performance on stock exchanges.

Many companies might question the need for public reporting of their environmental performance. Those who are already realizing what may be considered sensitive information, may wonder why they are bothering when disclosure can often invite attack. In an industry where resources (human and financial) are often scarce, many companies will also question if this is the best use of these resources. However, corporate environmental reporting is a key channel for companies to communicate their environmental performance to the world at large. Reports are also an effective tool within an organization, helping to integrate environmental management with other management and

accounting systems, and putting the message of corporate responsibility across to employees.

There is an increasing trend towards producing environmental reports, both due to the industry facing up to environmental challenges and legislation, and the growing public demand for adequate information on corporate performance and responsibility. Environmental reporting, and continual assessment and improvement, is also a requirement of industry standards such as ISO 14001, whereby companies have to account for their actions to stakeholders. Earlier this year, Cambior announced that it had become the world's first gold mining company to achieve this prestigious award (*MEM*, May 1999, p. 17). Mining companies need to accept that holding such an industry standard will be beneficial to both their operation and their reputation.

The environmental agenda is constantly evolving and can no longer be seen in isolation. The environment must be viewed as an 'add-on' but integrated into all aspects of the decision-making process. A wide range of factors, coupled with the growing expectations of the public towards the environment and social responsibility of industry, is influencing the mining industry and a number of trends are emerging.

The development of new and improved technologies has done much to improve the environmental impact of mining on the environment throughout all stages of operation, from extraction through processing to recovery. However, the resultant waste material remains a huge challenge. Careful design and management of waste dumps and tailings facilities needs to be implemented at all operations.

In addition, a proactive approach towards the environment is essential, and the financial cost of environmental and social impacts should be integrated into mining companies initial business plans. The rising expectations of different stakeholders are continuing to challenge corporate strategy. Industry will only gain the popular understanding and support it both wants and needs if it responds positively, otherwise it may find that the agenda is constantly being set by others.

Community issues are at the forefront of the environmental agenda. Companies need to ensure that the socio-economic stability of a community is maintained or improved. However, positive relations are not easy to form, and companies may need to engage in dialogue through independent facilitators in order to be successful.

Many parties, from pressure groups to analysts, are now looking more closely at corporate environmental performance. Industry needs to face up to these challenges, and corporate reporting is an essential tool in proving its commitment to responsible behaviour.

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\* (*Reprinted from Mining Magazine, September 1999, pp. 158-163.*)

