

MINING FOR THE FUTURE

There is no escaping the fact that extraction of mineral resources from the earth and its oceans is not sustainable in the long-term. However, there are ways in which the industry can work to a more sustainable model

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The mining industry has a crucial role to play in the responsible development of the world's natural resources, given the substantial and direct social, environmental and economic impacts its activities can have. Improvements can be made across energy usage, water management, compliance with social and environmental impact assessment legislation and increased investment into the research and development of new and innovative ways to 'clean' the raw materials and reduce harmful emissions.

EIA AND SOCIAL ASSESSMENT

Exploration and mining activities are expanding into areas of critical habitat. Degradation of these areas can result in

the loss of threatened or endangered species, as well as ecosystems vital to the provision of services such as food production and freshwater availability.

Failure by mining companies to manage local environmental and community relations effectively can cause serious disruption, ranging from temporary shutdowns to project delays and loss of licences—ultimately resulting in an unsustainable mining industry. This, along with the growing awareness of sustainability in mining, has led to an increased demand for EIA and SIA professionals working within the mining industry. Not only do EIA licences need to be granted for the mining project to proceed, demonstrating the move to more sustainable mining; but EIA processes provide

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The ethos at Gold Fields Ghana is to operate honourably and respectfully



a valuable opportunity for the local community to participate in decisions about mines—and their involvement at the planning stages can help to prevent issues further down the line.

Each phase of mining has an environmental and social impact on the local community, from the clearing of vegetation, to the construction of access roads, and the creation of the mining pit. A good ESIA

professional will ensure that the potential health risks of mining, such as the hazardous chemicals in waste and water, do not affect the local environment or community.

SIA professionals may have to manage the resettlement of communities during a period in which they feel particularly vulnerable. Maintaining good relationships with local authorities and enabling local communities to play a

role in the decision making process are also important aspects involved in SIA management, and are key to making the mining industry more sustainable.

ENERGY EFFICIENCY

Among the most pressing environmental concerns for stakeholders associated with the mining industry are energy efficiency and water usage.

An exciting sustainable development that will

“EACH PHASE OF MINING HAS AN ENVIRONMENTAL AND SOCIAL IMPACT ON THE LOCAL COMMUNITY”

improve energy efficiency in the mining industry is being implemented by Rio Tinto, who is developing the ‘Mine of the Future’, a robotic iron ore mine in Pilbara, Australia, which will rely more on remote

controlled equipment and energy efficient solutions. A continual transition to more efficient mining is also taking place in South Africa, where as recently as March 2012, mining companies have been looking at solar or wind power to substitute grid power for parts of powering operations and floodlights.

Some companies have also become directly involved in electricity generation. Rio Tinto, for example, has its own hydropower generating facilities with combined generating capacity of over 3,500 MW for energy usage at its mines. Furthermore, a new joint mining venture in South Africa aims to provide the foundation for a shallow and low-cost platinum mining complex. The mine hopes to make use of the Kell Process, which uses only one-fifth of the energy used in conventional

platinum smelting.

Changes in laws, technologies and attitudes have begun to address some of the most immediate threats posed by mining to the water system. Water pollution problems include acid mine drainage,

3,500 MW

Generating capacity of Rio Tinto's hydropower facilities

metal contamination and increased sediment levels in streams. A number of preventable accidents that have occurred recently include massive sediment loading into fish-bearing streams, the building of roads with acid-generating waste rock, non-compliance with waste handling plans,



Driverless trucks in action at the ‘Mine of the Future’ Pilbara, Australia

and repeated violations of water quality standards.

In the right place—and with conscientious companies, new technologies and good planning—many of the potential impacts are avoidable. In fact, it has been argued that most water pollution caused by mining arises from negligence, not necessity. Therefore, having the right water professionals working within mining companies can ensure mining pollution does not occur.

CLEAN COAL AND NEW INNOVATIONS

Coal mining is also an industry that is investing significantly in environmental processes and research into clean coal technologies. Clean coal has a number of variations, but each one of them involve stripping the CO2 out of the coal, either before or after

it is burned and then capturing it. It is then either utilised for industrial purposes or for enhanced oil recovery; otherwise it is pressurised into a liquid form where it can be injected underground where it is designed to stay indefinitely in a process called carbon sequestration. The overall process is called carbon capture and storage (CCS).

The least destructive form of clean coal is underground coal gasification (UCG). This is where the coal is left in the ground and converted to gas by chemical means and then sucked up to the surface where it is burned.

China has positively embraced the concept of moving towards cleaner coal technologies to lessen problems with greenhouse gases and reduce the release of sulphur and nitrogen oxide, which are the main contributors to acid rain.

BIODIVERSITY

In 2010, the UN declared a ‘Decade of biodiversity’, highlighting the requirement for the conservation of biodiversity in mining through 2010 to 2020 and beyond. Post-2010, a case study of the



The Debmar Atlantic, one of De Beers’ diamond mining vessels

De Beers Marine mine in South Africa demonstrated the company’s move towards a more sustainable extraction process.

Mining activities at the De Beers Marine mine in South Africa altered the nature of the seabed landscape, where the biological communities living in the affected soft sediment areas were destroyed during the mining processes. To counteract this and preserve the seabed, De Beers invested

CCS

Carbon capture and storage

seabed environment and its biological communities around Southern Africa was improved by involvement in research of marine science.

By collaborating with the World Wildlife Fund and the South African National Biodiversity Institute in the planning phase and through the recruitment of conservation planners, De Beers altered its mining processes to ensure the natural recovery of sediment habitats.

in independent scientific assessments of mining operations, of which the results demonstrated that natural recovery of the unconsolidated sediment habitats occurs over time. The understanding of the

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“SUGGESTED IMPROVEMENTS INCLUDE INCORPORATING SUSTAINABLE DEVELOPMENT INTO THE CURRICULUM FOR MINERALS PROFESSIONALS”



Water pollution of a copper mine

COLLABORATION IS KEY

The mining and minerals industry has always been on the receiving end of environmental criticism but it appears the industry itself is embarking upon its own campaign—the recruitment of environmental and sustainable professionals to move the industry towards a more permanently sustainable model.

The two-year Mining, Minerals and Sustainable Development (MMSD) project, led by the late Richard Sandbrook at the International Institute for Environment and Development and completed earlier this year, is also certain to go a long way towards developments in more environmentally friendly mining.

The project assessed the global mining and minerals sector’s transition

MMSD

Mining, Minerals and Sustainable Development project

to sustainable development, identifying how services provided throughout the supply chain can be delivered in ways that support sustainable development; proposing key elements for improving the minerals system; and building platforms for ongoing communication and networking.

The conclusion was that sustainable development in the minerals sector can be achieved through increased understanding of the principles of sustainable development; creating the right organisational-level

policies and management systems; collaborating with others with common interests; and increasing the ability to work towards sustainable development at local, national and global level.

Suggested improvements included incorporating sustainable development into the curriculum for minerals professionals; educating employees, government officials, civil society and labour organisations; and increasing the number of sustainability and environmental professionals within the mining industry.

In summary, mining is a challenging environment for the sustainability professional, but one in which there are opportunities to make a huge difference in terms of impact on the planet. **BE**

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