

# **Presentation to the International Manganese Institute: 12 June 2006**

## **Beyond Corporate Responsibility for the Environment – A Sustainable Development Strategy for the Manganese Industry**

Andre van der Bergh  
BHP Billiton

### **1. Introduction**

For the human race, the last three hundred years have marked a dramatic departure from *business as usual*. By the end of the last century, humans were changing the face of the earth at an unprecedented pace. In the 20<sup>th</sup> century, humans used ten times more energy than they had used in the preceding thousand years (McNeill, 2001). Human activities dwarfed even geomorphological processes and were ranked second only to water as the largest mover of rock and soil on the planet, moving nearly 40,000 Mt of material annually – glaciers move less than 5,000 Mt globally each year (Hooke, 1994, in McNeil, 2001).

The acceleration in our impacts commenced in earnest with the Industrial Revolution in Europe. This brought with it extreme levels of pollution and poor working conditions. The resultant backlash eventually resulted in improvements in industrial environments, but mainly in developed countries, which account for only about 12% of humanity. Impacts in other countries continue to grow, and by 1990 emissions of local and regional air pollutants were estimated to be five times the levels in 1900 (McNeill, 2001).

There is little doubt that the destructive impact of human activities is increasing. Between 1970 and 1995, natural forest cover decreased by 10%, freshwater species showed a 45% decline and marine species a 35% decline (Adams, 2001). Increases in extinction rates and reductions in biodiversity are estimated at between 10 and 10,000 times higher than historical rates. Increasing pressure on the environment coupled with increases in population (a six-fold increase over the last 150 years – Ehrlich, 2002) and dramatic increases in per capita consumption have resulted in higher risks to human society.

As a consequence, all sectors of the global economy are increasingly expected to minimise their environmental impacts while maximising the developmental benefits arising from their operations.

## 2. The business case for SD in the extractive industries

The risks associated with appropriating ever greater portions of global ecosystems to meet our needs have become apparent. Civil society is now exerting pressure for changes in the way the global economy is run. This pressure is expressed in a variety of ways, from riots at World Trade Organisation (WTO) meetings to the increasing popularity of stocks listed on good practice share indices such as the *Dow Jones Sustainability Index* in New York and London's *FTSE for Good*.

Reaction to the deterioration of the global environment was first expressed in the green movements of the 1970s. Gradual awareness of the need to improve the lot of the world's poor resulted in the emergence of the concept of sustainable development (SD), most famously defined in the "Brundtland Report" (WCED, 1987) as "*development that meets the needs of the present without compromising the ability of future generations to meet their own needs*". This concept essentially considers humans as part of the broader environment and presents a framework for balancing the environment and human development.

Fund managers, bankers, insurers and national governments are now asking questions about company and industry performance and assigning risk profiles according to the level at which companies are able to manage their impacts. Not surprisingly, high-impact industries such as oil and gas and mining and metals have been subjected to particularly close scrutiny.

The extractive industries present a conundrum, for while the exploitation of ore deposits is inherently unsustainable and results in environmental disturbance, the use of mineral resources is key to the well-being of society, as they are essential to every sector of the economy.

The World Bank argues that sustainable development in the mining sector requires "*projects that are financially viable, environmentally sound, socially responsible, implemented with sound governance (not only companies but also communities and governments) and have lasting developmental value, especially at the community level*" (Van Der Veen & Strongman, 2003).

At first sight, this appears to place a huge burden on companies, but the Bank, through the International Finance Corporation (IFC), has assessed the business case for sustainable development and has found that sustainability can increase all elements of the triple bottom line (financial, environmental and social) and can contribute to public goods rather than simply adding economic costs (Van Der Veen & Strongman, 2003). Sustainable development initiatives result in financial/commercial improvements that are related to:

- reduced project risk'
- improved efficiency and reduced operating costs, and
- a combination of revenue/market share growth, human capital improvements and reputational enhancement.

Historically, poor management practices and lack of capacity have resulted in significant environmental degradation and human health impacts. This makes the application of the SD paradigm to the minerals sector both essential and difficult. In practice, progress towards the sustainable development of minerals can be achieved by the following interventions (BGS, 2004):

- applying the highest standards of environmental management,
- adopting an open, transparent and inclusive approach to development,
- communicating regularly with all interested parties,
- ensuring benefits are distributed equitably,
- ensuring optimal use of raw materials,
- reducing energy consumption and waste generation,
- recycling and developing new products from 'waste' materials, and
- early planning for closure.

In South Africa, recent developments in legislation have mandated equity in the workplace and development benefits to communities. These requirements are additional to increasingly rigorous environmental regulations. To remain profitable in this environment, companies have to ensure that they maximise sustainability dividends. Increasingly, companies require a *social licence to operate* in addition to meeting the minimum requirements of national legislation.

Nelson, a researcher at the University of British Columbia, quotes Lassonde (2003, in Nelson, 2006): *“Social Licence is the acceptance and belief by society, and specifically our local communities, in the value creation of our activities, such as we are allowed to access and extract mineral resources. ... You don't get your social licence by going to a government ministry and making an application or simply paying a fee. ... It requires far more than money to truly become part of the communities in which you operate.”*

Securing a social license may be critical in the development of any new industrial project. An example offered by Nelson (2006) is the decision by Newmont to stop their 3.7 million ounce Cerro Quilish gold project in Peru after two weeks of protesting by community members in 2004. To avoid such costly project losses, Nelson argues that mining companies need planning processes that enable early, integrated and comprehensive analysis of the political, economic, social and technological factors that are likely to affect their projects.

### **3. The manganese industry's ability to respond**

More than nine-tenths of manganese ore is produced by ten countries, the leading producers being South Africa, Australia, Brazil, Gabon, China and the Ukraine. The leading producers of ferro-alloys are China, the Ukraine, South Africa, Japan, Norway, India, Brazil and Russia (both lists in order of decreasing magnitude in 2004) (USGS, 2004a). The ten countries listed above represent a wide range of operating jurisdictions and levels of government oversight and stewardship of the environment, workers' health and community rights. This situation is compounded by the fact that manganese is produced or processed in a further 60-odd countries, ranging from Argentina to Zimbabwe. In a review of producing and processing countries, Global Information Inc. (2006) lists no fewer than 76 major companies engaged in the manganese sector.

Technological solutions to extracting lower grades of manganese ore in the future have appeared on the horizon: Pagnanelli et al. (2004, cited in USGS, 2004a) have reported on the use of carbohydrates to leach low-grade manganese oxide ores to concentrate manganese, calcium and iron for food production. In addition to these developments, under-sea deposits have been delineated that can produce 3 Mt of metal annually for 100 years (USGS, 2004a).

While manganese is utilised widely in steel products<sup>1</sup>, among others<sup>2</sup>, upon which our civilisation depends, it has several drawbacks: current recycling rates are low (37%), as are the efficiencies at which this recycling occurs (53%) (Jones, 2004). According to Sharma, exposure to elevated levels of manganese, either as particulate matter or in drinking water, may have adverse health effects. While manganese is an essential nutrient, excessive consumption has been linked to neurotoxicity in adults (Sharma, 2006).

Potential toxic exposures will become more of an issue for the manganese industry once the Registration, Evaluation and Authorisation of Chemicals (REACH) regulatory framework is fully implemented by the European Union. Under this framework, greater responsibility is delegated to industry to manage the risks from chemicals (including metals) and to provide safety information on these substances. Manufacturers and importers will have to register information on the properties of their substances on a central database. While this will improve the ability of the industry to manage the safety and health risks associated with manganese, it represents a potential threat. If companies wait for market access restrictions before implementing comprehensive assessments, coupled with programmes for managing safety and health risks, the cost to the sector could be significant.

In a review undertaken by researchers from the London School of Hygiene and Tropical Medicine (Stephens & Ahern, 2001), commissioned by the Mining, Minerals and Sustainable Development project (MMSD), mining is described as one of the most hazardous occupations globally in terms of both short-term injuries and fatalities and long-term impacts such as cancers and respiratory conditions. For this reason, the sector's activities in some instances currently undermine a key tenet of sustainable development: the protection of the health of current and future generations. Much still has to be done to transform the sector into a healthy working environment for employees and development environment for communities. There is also much to be done before industry, workers and communities agree on the real health impacts of the sector and the responsibilities of each of the actors. If real advances are to be made by manganese producers and processors, collective action is required: the standard at which the sector operates must be raised.

## 4. Analysis

Each sector and each commodity within each sector has to earn its social license to operate. Although attaining this license is difficult, keeping it may be even more difficult. There are many ways of achieving this, but arguably one of the most

---

<sup>1</sup> Primarily in the construction (23%), machinery (14%) and transportation (11%) industries (Hagelstein, 2005).

<sup>2</sup> In addition to the production of raw steel and upgrading of ferro-alloys, manganese is used in the production of dry-cell batteries, plant fertilizer components and animal feed and as a colorant for bricks (Hagelstein, 2005).

effective is to raise the level of health, safety, environment and community (HSEC) performance of a company. One or two poor performers may completely undermine the efforts of the rest of the sector, however, and while leading companies have achieved much in this direction already, without a groundswell of support for sustainability, across producers and processors and right down the value chain, the pressure to switch to less harmful materials may become irresistible, as it has in the asbestos sector. The increasingly powerful public seldom differentiates between the bad practices of an individual mine and those of a specific commodity sector.

Over the last twenty years, environmental pressures from governments and civil society have created a need to change the way industrial products are used. In France, for example, manufacturers, dismantlers, recoverers and recyclers, together with material producers, signed an agreement with the government in 1993 on the management of end-of-life automotive vehicle waste. In terms of this agreement waste for ultimate disposal would amount to no more than 15% of the total weight of a vehicle by 2002, and no more than 5% by 2015 (Lowman, 1997). To retain market share in an increasingly competitive marketplace, a metal must strive to be the material of choice. It must be cost-effective and the producer must be able to demonstrate managed levels of environmental harm. End users are increasingly applying life cycle assessments to inform their choice of materials and with some poor track records, metals are losing out to plastics and ceramics. To remain relevant to the end users and preserve market share, metals companies have to understand where the market is going and what end users want.

Two commodity groups that have made concerted efforts to counter negative perceptions, and poor historical performance, are diamonds – the Kimberley Process – and lead – the Green Lead initiative. In the diamond sector, increasing concern was raised by NGOs in the late 1990s over human rights abuses by groups funded by illicit diamond trading, especially in Sierra Leone and Angola. These so-called “*blood diamonds*” accounted for approximately 4% of the global trade but threatened to tarnish the entire industry and negatively affect jewellery sales (Amnesty International, 2006). A cooperative response was mounted by the international diamond community, who voluntarily declared that they would eliminate conflict diamonds from the diamond trade. De Beers played a leading role in imposing these controls and the process was supported by a number of producers, including BHP Billiton. This was followed up by UN resolutions recognising signatory states. While this process is far from perfect and is still struggling to implement resolutions in some jurisdictions, the broad-based support for it from the sector has gone a long way towards reducing the impacts of human rights abuses on the marketability of diamonds.

Lead is a commodity infamous for its environmental and health impacts. The US Environmental Protection Agency (EPA) reports that people and animals may be exposed to lead by breathing and by ingesting the metal in food, water, soil or dust. Once in the body, it accumulates in blood, bones, muscles and fat. The impacts of this accumulation include:

- organ damage,
- seizures, mental retardation and behaviour disorders,
- high blood pressure and heart disease,
- retardation of vegetation growth, even at low concentrations,
- reproductive damage and blood and neurological damage to aquatic life,

(US EPA, 2006).

Lead was formerly widely used in paint, but the impacts associated with the metal resulted in its banning for this use in the US as far back as 1978. Lead was also

used in petroleum and is now being phased out globally. New legislation in some European countries has placed an increasing number of limitations on the use of this metal. These trends have resulted in a reduction in the number of markets available to lead producers and could ultimately put them out of business. In response, the lead industry launched the Green Lead project. This project, initiated and sponsored by BHP Billiton, is intended to independently certify that producers are applying best practice to all aspects of the product life cycle – mining, processing, transporting, treating, manufacturing, storing, using and recycling. It is supported by industry stakeholders involved in mining, smelting, manufacturing and recycling (Green Lead, 2006).

The project aims to identify and quantify the environmental, safety, health and social impacts associated with lead exposure throughout its life cycle. Pathways of lead leakage into the environment will be identified and remedial measures developed. The results of these site management programmes, plans and reports will be used to create performance criteria and standards to improve the entire sector, backed by industry-wide certification criteria and processes. This will enable industry to demonstrate responsible and safe production and use of lead and thereby protect markets for the metal.

What is clear from these examples is that the risk of market share loss due to HSEC impacts is high. Producers and processors of manganese need to learn from Green Lead and the Kimberley Process. The Global Reporting Initiative (GRI) has developed an extensive set of indicators for reporting HSEC performance. Reporting against these indicators helps companies to understand and manage their impacts. Management systems, such as ISO 14001, provide companies with tools for changing the ways in which they operate, thereby reducing their impacts. There are also a number of guidelines intended to improve company performance. Many of these are based on international best practice and provide a benchmark against which company performance can be assessed. Examples include the OECD Guidelines for Multinational Corporations, the Global Compact, the Extractive Industries Transparency Initiative (EITI), the US and UK Voluntary Principles on Human Rights and Security and the Equator Principles.

Markets and pressure groups can force producers to change in a reactive and defensive manner. When this happens, the sector loses the opportunity to take the initiative and influence the terms of the new deal in the marketplace. The manganese sector needs to look at what has happened in the markets of more contentious commodities and develop a proactive approach to promote the sustainable use and stewardship of manganese in the future.

## **5. Recommendations**

To ensure a sustainable manganese business in the future, commodity-wide cooperation is required. Industry needs to commit to sustainability frameworks such as those adopted by the ICMM. The manganese sector does not have to re-invent the wheel, as much of the work has been done already. The ICMM principles provide valuable guidance for moving the mining and metals sector towards sustainability. These principals require companies to:

1. implement and maintain ethical business practices and sound systems of corporate governance,

2. integrate sustainable development considerations within the corporate decision-making process,
  3. uphold fundamental human rights and respect cultures, customs and values in dealings with employees and others who are affected by their activities,
  4. implement risk management strategies based on valid data and sound science,
  5. seek continual improvement of their health and safety performance,
  6. seek continual improvement of their environmental performance,
  7. contribute to conservation of biodiversity and integrated approaches to land use planning,
  8. facilitate and encourage responsible product design, use, re-use, recycling and disposal of their products,
  9. contribute to the social, economic and institutional development of the communities in which they operate, and
  10. implement effective and transparent engagement, communication and independently verified reporting arrangements with their stakeholders,
- (ICMM, 2003).

The manganese industry now has the opportunity to invest in its future. Uptake of good practice principles such as those of the ICMM must be facilitated across the sector, but more is needed.

The sector needs to ensure that such mutually agreed principles are adhered to by members. To win the trust of both the markets and the industry's stakeholders, the sector must effectively demonstrate that principles are followed up with implementation. This requires appropriate governance measures to be in place to facilitate effective implementation, measures that may include evaluation of member performance against the above-mentioned principles. IMnI membership under these conditions does not come cheaply, but this collective action will enhance the credibility of the sector and demonstrate to the world that the manganese industry is serious about its contribution to the sustainable development agenda.

## 6. References

**Adams, W.M. (2001)** *Green Development: Environment and Sustainability in the Third World*, 2<sup>nd</sup> Edition, Routledge, London, p 10.

**Amnesty International (2006)** *The True Cost of Diamonds – Kimberley Process*, <http://web.amnesty.org/pages/ec-diamonds-eng>, accessed May 2006.

**BGS (British Geological Survey) (2004)** Sustainable development of minerals, *Mineral Matters 8*, ODPM-BGS Joint Minerals Programme, British Geological Survey, Keyworth, Nottingham, UK, 4 pp.

**De Wet, L.P.D., H.J. Schoonbee, C.A.R. Bain & J.J. Hancke (1995)** Concentrations and concentration ratios of <sup>226</sup>Ra and uranium in aquatic ecosystems and agricultural produce affected by mine drainage effluents with reference to the potential pathways and dose assessments to man, *Proceedings of the SADC Conference on Mining and the Environment*, Chamber of Mines of South Africa, Johannesburg, 25–27 October.

**Ehrlich, P.R., (2002)**, Keeping the Blue Planet habitable: a multidisciplinary challenge, *A Better Future for the Planet Earth, Vol.2: Lectures by Winners of the Blue Planet Prize*, Asahi Glass Foundation, Tokyo, Japan, pp 119-129.

**Green Lead (2006)** *Green Lead™*, <http://www.greenlead.com/>, accessed May 2006.

**Global Information Inc., (2006)**, The economics of manganese 2003/4, *The Vertical Markets Research Portal*, [http://www.the-infoshop.com/study/ros13984\\_manganese\\_toc.html](http://www.the-infoshop.com/study/ros13984_manganese_toc.html), accessed May 2006.

**Hagelstein, K. (2005)**, Globally sustainable – manganese metal production and use, Proceedings: *International Conference on Energy, Environment and Disasters – INCEED 2005*, Charlotte, NC, USA, July 24-30.

**ICMM (International Council on Mining and Metals) (2003)**, *Ten Principals for Sustainable Development Performance*, [http://www.icmm.com/icmm\\_principles.php](http://www.icmm.com/icmm_principles.php), accessed May 2006.

**Jones, T.S. (2004)**, Manganese recycling in the United States in 1998, *Flow Studies for Recycling Metal Commodities in the United States*, S.F. Sibley (ed.), Circular 1196-A-M, U.S. Geological Survey, Reston, Virginia, pp 98-110.

**Lowman, R.W. (1997)** *Life Cycle Assessment and Public Policy Development for the Automotive Industry*, address presented at the Total Life Cycle Conference and Exposition, Auburn Hills, MI, USA, April 7-9, [http://www.plastics-car.com/s\\_plasticscar/sec.asp?CID=514&DID=1598](http://www.plastics-car.com/s_plasticscar/sec.asp?CID=514&DID=1598), accessed May 2006.

**McNeill, J.R. (2001)** *Something New Under the Sun – an Environmental History of the Twentieth-Century World*, W.W. Norton & Co. Inc., New York, USA.

**MMSD (Mining, Minerals and Sustainable Development) (2002)** *Breaking New Ground*, Mining Minerals and Sustainable Development, The Report of the MMSD Project, International Institute for Environment and Development and the World Business Council for Sustainable Development, Earthscan Publications, 441 pp.

**Nelson, J. (2006)** *Social License to Operate: Integration into Mine Planning*, UBC mining Engineering, <http://mining.ubc.ca/files/SocialLicense/JNelsonThesisAbstract.doc>, accessed May 2006

**Sharma, D.C., (2006)** Manganese in drinking water: higher doses may hamper intellectual function, *Environmental Health Perspectives*, National Institute of Environmental Health Sciences, Vol. 5, No. 6, May 2006, <http://www.ehponline.org/docs/2006/114-1/ss.html>, accessed May 2006.

**Stephens, C. & M. Ahern (2001)** *Worker and Community Health Impacts Related to Mining Operations Internationally: A Rapid Review of the Literature*, MMSD report No. 25, 59 pp.

**US EPA (United States Environmental Protection Agency) (2006)** *Health and Environmental Impacts of Lead*, <http://www.epa.gov/oar/urbanair/lead/hlth.html>, accessed May 2006.

**USGS (United States Geological Survey) (2004a)**, *Manganese Yearbook*, <http://minerals.usgs.gov/minerals/pubs/commodity/manganese/>, accessed May 2006.

**USGS (United States Geological Survey) (2004b)**, *Asbestos Statistics*, <http://minerals.usgs.gov/ds/2005/140/>, accessed 05/May 2006.

**USGS (United States Geological Survey) (2006)**, *Asbestos*, <http://minerals.usgs.gov/minerals/pubs/commodity/asbestos/>, accessed 05/May 2006.

**Van Der Veen, P. & J. Strongman (2003)**, Sustainable development – the way forward for the mining industry, in *Proceedings of the International Conference: Sustainable Development Indicators in the Mineral Industries*, ed. Z. Agioutantis, Milos Conference Centre – George Eliopoulos, 21-23 May, Milos Island, Greece, 21-23 May, pp 17-23.

**WCED (1987)** *Our Common Future*, UN World Commission on Environment and Development, Oxford University Press.