Sustainable Development and Risk Management in the Minerals Industry

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“When I say risk, I mean risk to the business, not risk to the environment”
Larry Weinberg, Boeing

Introduction
Sustainable development is a contested concept. In the seventeen years following the publication of “Our Common Future” (World Commission on Environment and Development 1987), there has been an ongoing and lively debate amongst various groups in society regarding appropriate definitions, frameworks and indicators. Much of the effort in this area has been centred on assisting various groups and industry sectors in “operationalising” the broad principles espoused by the report and subsequent agreements such as the Rio Declaration of 1991, and Australia’s own National Strategy for Ecologically Sustainable Development (1992).

The increasing focus on sustainable development has coincided with an apparent shift in societal attitudes towards the mineral industry, as evidenced in the following quote:

*The discovery, extraction and processing of mineral resources is widely regarded as one of the most environmentally and socially disruptive activities undertaken by humankind* (Peck and Sinding 2003)

Whilst those who have chosen to spend their lives working in the industry are unlikely to agree with this statement, there are an increasing number of examples where potential mining operations have not gone ahead due to community concerns regarding potential negative environmental and social outcomes. It is therefore not surprising that the industry has collectively involved itself in the debate regarding sustainable development and its own activities, particularly since 1999 with the commencement of the Global Mining Initiative.

Recent significant outcomes have included the publication of the “Breaking New Ground” report (IIED 2002) and the finalisation of the International Council on Mining and Metals (ICMM) Sustainable Development Framework. The latter contains a set of Principles and Elements that ICMM industry members have committed themselves to using for self-assessment. Another relevant and current Australian initiative is the Mining Certification Evaluation Project (MCEP) being coordinated by a group including the WWF, CSIRO and several Australian-based companies.

Included in most of these initiatives are references to the use of risk management techniques to address issues of sustainable development. Consider the following:

*Implement risk management strategies based on valid data and sound science* – ICMM Framework
The mine site operator has a risk management system that takes account of social, cultural, health, safety, environmental and economic risks throughout the mine life cycle – draft MCEP Criteria

Similarly, the recent AusIMM Conference on Mining Risk Management featured a section entitled “Risk Management for the Environment and Sustainability”, with a keynote paper from Chris Burnup which focussed on issues of risk and community, and the emergence of a “risk society”. She suggested that:

So-called ‘soft’ issues can determine a company’s survival and are still under-resourced. The hard and soft issues need to be renamed ‘hard’ and ‘harder’ because the latter are harder to deal with (Burnup 2003)

This article briefly reviews some trends in industry thinking regarding the application of risk management in these “harder” areas, and also highlights some of the issues and questions that arise.

Risk management and the minerals industry

The current Australian Standard for Risk Management AS4360 (Standards Australia, 1999) defines risk as:

... the chance of something happening that will have an impact upon objectives. It is measured in terms of consequence and likelihood.

Within the boundaries of the risk management process, there are many different methods of risk analysis available. A key distinction is between qualitative and quantitative approaches. Qualitative risk analysis generally involves the use of descriptive scales for likelihood and consequence, whereby each identified event or outcome is evaluated subjectively against standard descriptions. An example of such a qualitative scale is provided below, where the consequence or severity dimension is focussed on the impact on people’s health and safety.

| Minor negative impact | • Minor injury  
|                       | • Slight negative impact on individual health |
| Negative impact       | • Significant reportable injury  
|                       | • Major impact on health of several people |
| Major negative impact | • Major injury to one or more persons  
|                       | • Severe health impacts on a number of people |
| Significant negative impact | • Single fatality  
|                           | • Severe irreversible disability or impairment to one or more persons |
| Catastrophic impact   | • Multiple fatalities  
|                       | • Major permanent negative health impacts on a large number of people |

Table 1 – Typical qualitative descriptions of consequences for safety and health

Quantitative risk analysis seeks to use more specific data to assign discrete probabilities to events, based on historical data applicable to the system under consideration. Examples of this type of approach can be found in engineering applications, where failure rates for specific system components can be estimated with
some confidence. Hybrid, semi-quantitative, approaches have also been adopted in recent years in a variety of fields. However, this discussion will focus on qualitative analysis since this is more familiar to most people in the industry, and is better suited to the broad nature of the types of impact that have to be considered.

The minerals industry in Australia has a significant history of applying risk management techniques over recent years, as evidenced by the range of papers presented at the recent conference. In 2001, the Minerals Council of Australia commissioned a national project to derive “good practice” guidelines for the application of risk assessment. Several large mining companies and government agencies provided input and guidance to the project, the outcomes of which were generally consistent with the process model described in AS4360. The most recent version of the guideline was published in July 2003 (MISHC 2003), and reviews in detail the various types of risk assessment methods and their applicability to different situations.

The rapid growth in this area was driven originally by a focus on the need to improve health and safety performance, but the techniques have increasingly been applied to other specific issues such as environmental performance and broader aspects of business risk. For example, it is common to find qualitative risk ranking tables within Environmental Impact Assessment documents, and the field of Environmental Risk Management has been actively developed in recent years.

This broadening of focus has manifested itself in the inclusion of more impact categories in industry risk management procedures. Many companies use a series of qualitative scales of the type shown in the previous example, with several different consequence or severity scales that reflect different dimensions of concern such as health and safety, environmental, social and financial impacts. The construction and alignment of these scales therefore offers an opportunity to ask some questions that are relevant to the equally broad sustainable development debate. The first question is how these risks are “valued”, and whose perception of value is reflected in the tables. The second question is how positive impacts might be included, since sustainable development theory increasingly requires organisations to identify and deliver the positive benefits associated with mining operations as well as preventing or mitigating potential negative outcomes. These themes are explored in the following sections.

**Valuing sustainability risks**

Within the mining industry, a healthy debate has continued for several years on the business case for sustainable development. Whilst there is a broad acceptance that proactively managing social and environmental risks provides long term (and, in some cases, short term) benefits for a business, the exact formulation of this relationship remains elusive. However, consideration of an organisation’s consequence scales within a risk management procedure can provide an alternative method of approaching this issue. At the catastrophic level, multiple fatalities might be considered equivalent to irreparable damage to a significant ecosystem, major breakdown in social order or losses of >$10M. This explicit comparison of negative impacts therefore could be viewed as providing an implicit statement of the business case for avoiding them, since all outcomes have a direct cost equivalent in the financial impact dimension.
Consider the case of safety and health. Direct costs to a business of a serious workplace accident include investigations, compensation and premiums, lost production etc. There are also broader costs (especially in the case of a fatality or permanent disability) to the individual and society including hospitalisation, extended care, family disruption, etc. Detailed actuarial analyses can be used to place explicit financial value on injury and mortality frequencies. The explicit business case for safety and health in the industry is described as the “Safety Pays” argument by Hopkins in his book on the 1994 Moura disaster (Hopkins 1999). However, he suggests that an argument based solely on cost considerations is not always sufficient, and provides at least two examples to the contrary.

An alternative argument is that these consequence tables should be seen as reflecting a broader set of stakeholder values, rather than expressing a direct business case. Consider the following statement from the CEO of an Australian coal mining company:

*We DO NOT expose employees nor contractors’ employees to risks which we would find unacceptable for our partners, sons, brothers, daughters, sisters or anybody close to us* (Pegler 2003)

This statement focuses employees’ minds on their own personal values and relates them directly to the workplace. It is far removed from an explicit cost/benefit calculation and does not distinguish between costs to the business or society at large. It does not address the question of who bears the risk. It is, in fact, an ethical argument.

It is often argued that the failure of a business to respond to such values would result in the withdrawal of the “licence to operate”. However, the key question is whether consequence tables are a shorthand statement of business case calculations where risk is only incurred by the business, or whether they do in fact represent a reflection of broader societal values. There is little published information on the construction of risk consequence tables, and it could be asked whether it matters how relative impacts are generated, since outcomes with the same risk rating should receive similar focus. It is likely that increased understanding of well-established areas such as safety would shed more light on appropriate responses in other areas of attention, such as environmental and community impacts.

**Developing an opportunity focus**

Incorporating non-financial values for negative impacts into consequence scales is a well accepted practice in the industry, even if the underlying rationale is not always clearly understood by the participants or wider community. Attempting to use risk management procedures to expand this approach to include positive outcomes is somewhat more challenging.

The trend towards an opportunity focus is best expressed in a paper from Canada (Gibson 2001) which reviews the evolution of the sustainable development debate and its relevance to the process of impact assessment for large projects, including two mining examples. Gibson observes:

*... an expansion of central concern from avoidance of significant adverse effects to expectation of positive contribution to the achievement of sustainability objectives.*
He also highlights some of the difficulties involved, including the question of compromises and trade-offs where negative impacts are considered inevitable. A practical and local example from the resources sector can be seen in the approval process undertaken by the WA State Government for the Gorgon development, where a “net conservation benefit” was identified as a criterion. Putting to one side for now concerns over thresholds and theories of “weak” sustainability (where everything may be converted to other forms of capital as long as a net benefit results), it is clear that more formalised requirements are emerging for identifying and managing the types of benefits that proponents of mining operations have always used to help justify their developments.

In theory, risk management processes allow for the consideration of positive outcomes. For example, the current Australian Standard AS4360 (Standards Australia 1999) states that:

*Risk management is as much about identifying opportunities as avoiding or mitigating losses*

The recent draft update for this standard attempts to increase the focus on opportunity analysis. Two industry papers at the recent Water in Mining conference (Thompson and Minns 2003, Gibson et. al. 2003) explicitly refer to the use of risk management techniques to uncover opportunities in the eco-efficiency and water management areas. The author has also trialed similar approaches with several coal operations in Central Queensland to investigate a wide range of sustainability issues (Brereton et. al. 2003). However, in practice most industry experience with the application of risk management techniques lies squarely in avoiding negative outcomes, and few examples of specific processes to encourage an opportunity focus can be found.

Consider again the area of safety and health, and the generation of positive outcomes that mirror the negative ones highlighted in Table 1. A possible list is shown below in Table 2.

| Highly significant positive impact | • Positive “life-saving” impact on >100 lives  
| • Significant and sustained health improvements to >1000 persons. |
| Significant positive impact | • Multiple “life-saving” impact  
| • Significant permanent positive health impacts on a large number of people. |
| Major positive benefit | • Single “life saving” impact  
| • Major positive impact on healthy lifestyles behaviours  
| • Major improvement in safety performance |
| Positive impact | • Positive impact on health of several people |
| Minor positive impact | • Some positive impact on individual injury/health. |

Table 2 – Qualitative consequence scale for ‘positive’ health and safety outcomes
At first glance this might seem an unlikely area of focus. However, there are numerous examples where mining companies are actively involved in projects to deliver such benefits. For example:

- major disease eradication programmes in regions surrounding mining operations;
- provision of community health facilities in remote areas which result in measurable improvements to infant mortality rates and life expectancy;
- the extension of healthy lifestyle programmes to include families and communities associated with mining operations.

All of these could easily be aligned with outcomes in the table, and are obviously considered by the companies involved to be creating value in some form.

There are several unanswered questions regarding the use of risk management as a tool to uncover opportunities, and it is not intended to discuss these in depth here. There is much scope for the industry to evolve techniques for risk identification and analysis, currently focused on threats, to more effectively prompt and consider the equally important area of opportunities. The fundamental appeal of using the same tool to address both threats and opportunities is that it links closely to the area of impact analysis, and addresses the possibilities of positive contributions towards sustainability objectives.

**Summary**

Risk management is one of many tools available to the mining industry in its understanding of sustainable development. Since it is increasingly becoming an ubiquitous process for most issues addressed by the industry, it offers a familiar methodology to use to focus people on some of the broader issues involved.

The aim of this article has been to encourage some thought towards some of the underlying questions involved in the generation and application of risk analysis protocols, particularly the issues of value and opportunity. Since the aim of risk management is to focus attention on what is important, the consequence tables found within risk management procedures could be considered to be the ultimate pragmatic expression of corporate values. As such, they also provide a window through which to consider the balance between defensive strategies and more proactive responses to key sustainability issues.

There are many questions that emerge from this discussion, and it is likely that the application of risk management by the mining industry will continue to evolve as it tackles the ongoing challenges associated with the sustainable development debate. The quote at the beginning of the article was taken from a presentation at a recent conference on Life Cycle Analysis, where a Boeing manager exhorted his audience of mainly scientists to use management’s language when communicating with them. A somewhat different sentiment was expressed in a 2001 paper entitled “Sustainable Development: Can the Mineral Industry Afford It?” by the Chief Economist of Rio Tinto:

*Ultimately, this is not about costs but about the alignment of mining industry’s values with those of the societies in which it operates* (Humphreys 2001)
References


