



Pergamon

Resources Policy 26 (2000) 227–238

RESOURCES  
POLICY

www.elsevier.com/locate/resourpol

# Sustainable development in the mining industry: clarifying the corporate perspective

Gavin Hilson<sup>a</sup>, Barbara Murck<sup>b,\*</sup>

<sup>a</sup> *T.H. Huxley School of Environment, Earth Sciences and Engineering, Imperial College of Science, Technology and Medicine, Royal School of Mines, Prince Consort Road, London SW7 2BP, UK*

<sup>b</sup> *Department of Earth Sciences, University of Toronto at Mississauga, 3359 Mississauga Road, Mississauga, Ontario, Canada L5L 1C6*

Received 1 June 2000; received in revised form 9 October 2000; accepted 27 November 2000

## Abstract

This paper examines sustainable development in the corporate mining context, and provides some guidelines for mining companies seeking to operate more sustainably. There is now a burgeoning literature that examines sustainable development in the context of minerals and mining, most of which is concerned with sustainability at global and national scales. What is often challenging to ascertain, however, from these numerous perspectives on sustainable mineral extraction, minerals and metals recycling, environmental management, and social performance, is how sustainable development applies to mining companies themselves, and what steps a mine must take in order to improve the sustainability of operations. Since mining processes have the potential to impact a diverse group of environmental entities, and are of interest to a wide range of stakeholder groups, there is ample opportunity for the industry to operate more sustainably. Specifically, with improved planning, implementation of sound environmental management tools and cleaner technologies, extended social responsibility to stakeholder groups, the formation of sustainability partnerships, and improved training, a mine can improve performance in both the environmental and socioeconomic arenas, and thus contribute enormously to sustainable development at the mine level. © 2001 Elsevier Science Ltd. All rights reserved.

*Keywords:* Mining; Sustainable development; Sustainability; Mines

## Introduction

The debate surrounding sustainable development in the mining industry is a drawn-out one, which has long gained considerable attention from a wide range of parties. The Brundtland Commission, in its landmark report *Our Common Future*, defined sustainable development as “meeting the needs of the present without compromising the ability of future generations to meet their own needs” (WCED, 1987). This definition, however, fails to outline an effective sustainability framework for any industry to follow. The Brundtland Report emphasizes that no single blueprint for sustainability exists and that the ways in which countries achieve sustainable development will vary among the different economic and political systems around the world (NRC, 1995), prompting

a number of academics, industrialists and government employees to provide personal viewpoints on the applicability of sustainable development to mining. Consequently, the body of literature on this subject now contains a wide-range of interpretations, and increasingly it is becoming unclear as to how exactly mines can contribute to sustainable development.

Although many have defined and applied the concept differently (see Fig. 1), sustainable development, generally, is the combination of enhanced socioeconomic growth and development, and improved environmental protection and pollution prevention. It first received global endorsement as a management and developmental strategy at the highly popularized United Nations Conference on Environment and Development (UNCED), commonly known as the “Earth Summit”, in Rio, 1992, where 116 heads of state or government, 8000 delegates from 172 countries, and 3000 accredited individuals from nongovernmental organizations (Pezzoli, 1997) gathered to discuss practical strategies for tackling pressing global problems. Sustainable development has

\* Corresponding author. Tel.: +1-905-828-5426; fax: +1-905-828-3717.

*E-mail address:* bmurck@credit.erin.utoronto.ca (B. Murck).

- Environmental care “married” to development.
- Improving the quality of human life while living within the carrying capacity of supporting ecosystems.
- Development based on the principle of intergenerational inter-species and inter-group equity.
- Development that meets the needs of the present without compromising the ability of future generations to meet their own needs.
- An environmental “handrail” to guide development.
- A change in consumption patterns towards more benign products, and a shift in investment patterns towards augmenting environmental capital.
- A process that seeks to make manifest a higher standard of living for human beings...that recognizes this cannot be achieved at the expense of environmental integrity.

Fig. 1. Examples of definitions of sustainable development found in the literature. (Source: Barrow, 1999)

since become a key focus of planning, environmental protection, and remediation efforts worldwide, and several academics and industrialists, in an attempt to operationalize the concept, have developed a number of policy frameworks, indicator sets, and management guidelines for use by governments and businesses.

Most of the discussions on mines, minerals, and sustainable development to date are concerned with sustainability at the global and national scales. Some authors (e.g. Brown, 1993; Auty and Warhurst, 1993; Mikesell, 1994; Tilton, 1996; Auty and Mikesell, 1998) provide perspectives on how the benefits of mineral production and use can be sustained from generation to generation. Primary examples include sustained mineral assets (prolonged longevity of reserves) through conservation, and increased minerals and metals recycling. Others (e.g. Carbon, 1997; Miller, 1997) discuss the value of sustainable development as a guiding principle in mining environmental management. They argue that sustainable development has enormous utility when drafting key environmental codes of practice and in target setting, and or generally indicate that by preventing significant environmental problems from the outset, and by adopting proactive environmental standards, the mining industry can contribute to improved sustainability. Another group (e.g. James, 1999; Labonne, 1999; Eggert, 2000) view enhanced socioeconomic relations — more specifically, stakeholder consultation and participation — as an integral component of mine sustainability, or argue that social and cultural issues represent an important dimension of sustainable development.

Again, most of these and the other major mining sustainability pieces are global and national in focus, or are simply broad, holistic perspectives. What is clear, however, from reviewing this burgeoning body of literature, is that very little attention has been paid to mines themselves and on interpreting the appropriate role of mining corporations. The purpose of this paper, therefore, is to describe more clearly how mines can contribute to sustainable development, and to provide guidelines for mining companies seeking to operate more sustainably. The paper begins by clarifying sustainable development in

the corporate mining context by examining the key environmental and socioeconomic issues in the industry. Some guidelines are then presented as a performance tool for those mines keen on becoming more active in the arena of sustainable development. The paper concludes by presenting a case study of two Canadian mining companies, Rio Algom and Placer Dome Inc. — the management of both of which has been active in improving the sustainability of mine operations — in an attempt to illustrate how selected mining companies are embracing sustainable development at the corporate level.

### Clarifying sustainable development in the corporate mining context

As already indicated, the literature has failed to outline precisely how a mine can contribute to sustainable development. Theories pertaining to sustainable mineral extraction are not directly relevant to the sustainability agenda for an operating mine since management invests knowing that it is a temporary project that will function only as long as it is economically viable to extract and process mineral from ore. Of the authors that have provided some perspective on mine sustainability, few have integrated both key industrial environmental and socioeconomic issues into analysis, or explained what measures a mine must take to put sustainable development into practice. We maintain that sustainable development in the corporate mining context requires a commitment to continuous environmental and socioeconomic improvement, from mineral exploration, through operation, to closure. Both the environmental and socioeconomic sustainability agendas for mines are examined in this section of the paper.

#### *Environmental agenda for mines*

Minimizing adverse environmental impacts is an important goal for all industries keen on contributing to sustainable development. Every industry, in addition to generic environmental complications, faces industry-specific challenges that require careful planning, tactical investment, and strategic management to overcome. In the case of mining, the environmental problems resulting from operations are well known (see Table 1), particularly because the industry attracts considerable public attention with its ongoing need to obtain planning permission to take land out of other uses and to extract minerals (Richards, 1996), as well with its nuisance effects, such as noise, dust and traffic. To contribute to sustainable development, a mine must minimize environmental impacts throughout its lifecycle, from exploration, through extraction and refining, to reclamation. This is best accomplished through effective environmental management. During exploratory stages, effort must

متن کامل مقاله

دریافت فوری ←

**ISI**Articles

مرجع مقالات تخصصی ایران

- ✓ امکان دانلود نسخه تمام متن مقالات انگلیسی
- ✓ امکان دانلود نسخه ترجمه شده مقالات
- ✓ پذیرش سفارش ترجمه تخصصی
- ✓ امکان جستجو در آرشیو جامعی از صدها موضوع و هزاران مقاله
- ✓ امکان دانلود رایگان ۲ صفحه اول هر مقاله
- ✓ امکان پرداخت اینترنتی با کلیه کارت های عضو شتاب
- ✓ دانلود فوری مقاله پس از پرداخت آنلاین
- ✓ پشتیبانی کامل خرید با بهره مندی از سیستم هوشمند رهگیری سفارشات