

Environmental management system implementation in the mining industry: a key to achieving cleaner production

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Abstract

This article examines the business practicality of integrating an environmental management system (EMS) into mining and related operations, describes how it can contribute to cleaner production (CP) in the industry, and provides guidelines to facilitate implementation. An EMS, which is the component of the overall management system that includes organizational procedures, environmental responsibilities, and processes, can help a mining company comply with environmental regulations, identify technical and economic benefits, and ensure that corporate environmental policies are adopted and followed. To date, a number of multinational (mining) corporations—namely, the companies with economical and technological flexibility—have implemented comprehensive EMSs at sites, the key in such cases being the formation of working partnerships with administrative bodies and international organizations. A number of other mine sites worldwide, however, despite having important environmental management practices such as audits and policies in place, have received insufficient assistance and/or simply lack the requisite resources to integrate an effective EMS into operations. The article sketches a series of guidelines for mining companies keen on adopting comprehensive EMSs at sites, and argues that to facilitate widespread EMS implementation throughout the industry, expanded inputs are needed from governments, international environmental organizations, educational facilities, and the companies themselves. More specifically, regional governments must provide assistance to the more resource-deficient operations, local universities must provide the necessary EMS educational assistance to local miners and finance environmental technology demonstration projects, and

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international organizations must help disseminate valuable EMS information to mine managers and technical staff. © 2002 Elsevier Science B.V. All rights reserved.

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1. Introduction

There is a burgeoning literature that examines in detail the business practicality of integrating an environmental management system (EMS) into industrial operations. In short, an EMS, which is the component of the overall management system that includes organizational procedures, environmental responsibilities, and processes, helps an industry comply with environmental regulations, identify technical and economic benefits, and ensure that environmental policies are adopted and followed (Barrow, 1999). Unlike the conventional stand-alone environmental auditing and review processes, which tend only to assess the environmental situation of an enterprise at the time at which they are carried out, an EMS ensures that an organization's environmental targets and objectives are being effectively pursued. In fact, an EMS links audits, reviews, and other important environmental management processes through a network of management actions, procedures, documentations, and records, and is designed with the purpose of promoting continuous environmental improvement.

In the case of mining and allied operations, which are typically confronted with serious environmental complications and face the challenge of having to satisfy a diverse group of stakeholder demands, the implementation of an EMS is a necessary step toward achieving industrial cleaner production (CP). Several mines worldwide (see, e.g. WMC, 2001; Homestake Mining, 2001; Delta Gold, 2001) already have a comprehensive EMS in place, and in many cases, management credits it as being a principal factor behind industrial environmental improvements (see, e.g. Cambior, 2000; Noranda, 2001). Further, it has helped to put many of these operations in a better position to anticipate problems with waste and avoid costly environmental cleanup. Some mining companies (see, e.g. Falconbridge, 2000; Rio Tinto, 2001) have even gone one step further by obtaining international EMS certification—in most cases, that of the International Standards Organization (ISO), ISO 14001—at selected properties, which requires that specific procedures be in place for environmental monitoring, assessment and measurement purposes.

The majority of mines that have implemented a comprehensive EMS, certified or uncertified, are owned wholly or partly by multinational corporations, which have the financial and technological flexibility to ascertain its precise application and potential business benefits, and have the means to readily integrate it into industrial operations. What tends to be overlooked, however, is the fact that a number of other mining properties already have in place important system elements and management procedures that would allow for the convenient incorporation of environmental issues and eventual implementation of an EMS. For example, many sites have an environmental officer that is responsible for ensuring compliance with set environmental regulations. In addition, at a number of mines, environmental audits, impact appraisals and reviews are conducted periodically to assess environmental performance. Multinational mining companies have

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