

EXECUTIVE SUMMARY

This document offers recommendations for responsible metal mining, to help guide the appropriate siting and development of large-scale mineral development in sensitive environments, such as tropical forests. The paper offers ways in which the mining industry and governments that regulate that industry can minimize the mining sector's negative environmental and social impacts and increase its overall positive contribution to conservation and community development. The report begins with a look at recent trends in the mining industry and the overall movement of exploration activities to less-developed, more remote parts of the world. It then reviews the potential negative environmental and social impacts that mining projects can have in these areas and offers recommendations for management practices and technologies that companies can use to improve the performance of their operations. The paper concludes with a review of public sector planning and policy tools that governments can use to encourage and direct the responsible development of their national mining sectors.

Although these chapters are directed separately at the private and public sectors, in each case, the effective use and implementation of these tools and technologies will depend on the informed participation of both sectors. In addition, while the paper is designed primarily to be a tool for industry and government in improving the overall performance of the mining sector, it will also be a useful resource for NGOs, local community groups, development agencies and other interested parties that will be participating in conservation and community development efforts in the areas surrounding mining operations. At the end of the document, we have included a glossary and an appendix summarizing the basic processes used in mining and mineral production, for those stakeholders who are less familiar with the industry.

While we believe this paper offers a fairly comprehensive survey of the current thinking and technology for improving mining operations in general, it is far from complete. We have found in our research that there is little documentation on the collected experiences of and lessons learned from mining operations in sensitive environments, particularly in humid tropical forests. Thus, the recommendations presented here are not meant to be a definitive and final set of practices. Rather, we hope that the document will provide a starting point for continuing discussions and debate on responsible environmental and social practices and the importance of the appropriate siting of mines. Included in this discussion should be an analysis of areas that are simply too ecologically or culturally sensitive to withstand large-scale development, and where mineral development should not proceed because the environmental and social costs will be too high.

A New Geographic Focus

The international mining industry has expanded rapidly in the last decades, buoyed by growing global demand for minerals and an increasingly attractive economic and political climate for investment in much of the world. The focus of much of this expansion has been away from the traditional, developed sources of minerals and toward the less-developed and largely unexplored countries of Latin America, Africa and Asia. Many of these countries hold tremendous stores of biological diversity in addition to their vast mineral wealth, and this expansion, if it develops uncontrolled and irresponsibly, poses a

potentially massive threat to these ecological resources. Such areas are also home to a wide diversity of human cultures and populations, some of whom have little or no experience with industrial development on the scale of a major mining operation.

In this section, we examine the recent explosion in mineral exploration throughout the world and particularly in the developing world. We discuss several of the reasons behind this geographic shift, including the changing economics and technologies of the mining industry, increasingly open economies and liberalized markets, privatization of state-owned mining companies, and revisions of national mining codes and investment laws to provide increasingly attractive incentives for investment in mineral development in these countries. We conclude the section with a specific discussion of trends and project development in several countries in Latin America, Africa and Asia.

Industry Practices for Increasing the Environmental Responsibility of Mining

The wide range of mining techniques and mineral production processes can lead to an equally broad array of environmental impacts, particularly in highly sensitive ecosystems like tropical forests. Metal mining operations can directly lead to land-clearing and pollution of soil, water and air in surrounding areas, and may indirectly result in habitat degradation and deforestation by opening access to previously undeveloped areas. Despite the huge potential for negative consequences of these operations, there is a great deal that mining companies can do to prevent or minimize these impacts in areas that have been determined to be appropriate for mineral development. Implementation of such practices requires a general shift in traditional development thinking, to include environmental concerns in all aspects and phases of an operation, from planning through to closure and reclamation. Understanding and addressing these potential impacts will also be important to an operation's financial bottom line, decreasing the potential costs of liability, mitigation and clean-up.

In this section, we begin with a discussion of the general factors that will influence the extent and nature of a project's environmental impacts, and the importance of, and steps involved in, the development of a general overall environmental strategy. We next review the potential negative environmental impacts of large-scale mining projects and offer recommendations for practices and technologies that can help to minimize these impacts. We also discuss ways in which the mining industry can proactively contribute to overall conservation efforts in a specific region. These impacts and recommendations have been organized according to the different phases of a typical mining operation.

Industry Practices for Increasing the Social Responsibility of Mining

Just as a mining operation can have wide-ranging environmental impacts, it may also have a broad and potentially negative impact on surrounding communities, from isolated indigenous groups to economically integrated villages or towns. The sheer scale of a large mining operation may be completely new and unfamiliar to local communities, particularly in the developing world, and the resulting economic, cultural and demographic changes may have profound impacts on their societies. At the same time, positive impacts such as increased access to jobs, health care, education or sanitation may greatly raise a community's standard of living.

For many mining companies, social issues are a relatively new area of focus, particularly in countries with different histories, values and cultures from their own. While environmental issues have been studied and accepted as a necessary aspect of business, social issues are often ignored or avoided, because they are sometimes unfamiliar and because, unlike environmental technologies, there are few standard practices that will be applicable to every community in every place. Nevertheless, companies are increasingly finding that it is impossible to ignore these issues any longer, as poor community relations can impact operations through conflict and sometimes violence, leading to work stoppages and lost productivity.

In this section, we discuss the importance of an effective social program, both as a humanitarian effort and as a contribution to a company's global and local competitive advantage. We then discuss the potential negative social impacts of large-scale mining operations, including social and physical displacement, and the potential health and economic consequences of demographic shifts. Finally, we review practices that companies can use to lessen their negative impacts on local communities and increase their contributions to local well-being, including social assessment and monitoring, participatory consultation and planning, and appropriate compensation programs.

Government Tools for Promoting a Responsible Mining Sector

The actions of the private sector are only one half of the equation in the development of a responsible mining sector anywhere in the world. At the same time, the public sector, including national, regional and local governments, must create a legislative and regulatory environment in which responsible practices are required, supported and enforced. The first step for governments is to work closely with relevant stakeholders, including companies and local communities, to develop a comprehensive, long-range strategic land-use plan for mineral development. This plan should consider geologic, ecological and cultural priorities to determine the most appropriate locations for mines, as well as those areas in which mining should not take place. A comprehensive set of legislative standards and guidelines should be enacted and implemented by a capable and well-trained staff of regulators with sufficient resources and incentives to complete their jobs. Among the policy options that may be most effective in achieving these goals are financial and economic tools that offer incentives for compliance and good practices. Finally, a strong set of monitoring and enforcement tools are essential to the effectiveness of any government program.

In this section, we discuss the building blocks of effective government regulation of the mining industry, including long-term strategic land-use planning, and training and institutional reform within government ministries. We next discuss traditional legislation and regulation, as well as more innovative financial tools that can be used to regulate the mining industry. Finally, we conclude with a review of the importance of effective monitoring and enforcement strategies.

Recommendations

Following the last chapter of this document, we offer a complete list of the specific recommendations

that are listed under each individual section throughout the text. Below is a series of general principles that guide the full set of specific recommendations. Each of these principles should be used as a general guideline for the development of appropriate and responsible mining projects and sectors around the world.

- *Conduct complete environmental and social impact assessments.* Before any activity begins, mining companies and governments should work closely with local stakeholders to conduct thorough impact assessments, in order to determine the extent and range of any potential impacts. These assessments can help to determine if mining is appropriate in a specific area.
- *Develop an overall environmental and social strategy.* Each mining project should include a comprehensive management plan for addressing and mitigating potential adverse impacts, to improve the performance, productivity and profitability of an operation. This strategy should be developed at the start of the operation and should be integrated into all aspects and phases of a project. In conjunction with a management strategy, projects should include environmental and social monitoring to ensure the effectiveness and appropriateness of programs.
- *Supplement mitigation with proactive contributions to conservation and community well-being.* In addition to addressing and preventing negative impacts of their operations, mining companies should complement their management strategies with a program of contributions to local conservation or development efforts, such as park management, scientific research, health care, education or sanitation.
- *Professionalize both environmental and social activities.* Design and implementation of an environmental and social management strategy should be done by trained professionals, who are at a senior level in the company and have the authority and mandate to make decisions and carry out their programs.
- *Minimize the scope and extent of impacts on surrounding ecosystems.* Negative environmental impacts can be addressed, minimized and sometimes prevented by adhering to responsible management practices and using more effective technologies, such as building fewer roads, careful planning and siting of infrastructure, or comprehensive water and emissions treatment. Controlling waste management through careful siting and construction of tailings impoundments, monitoring of waste storage areas and treatment of contaminated water or soil will also help to minimize the scale and range of negative impacts and save time and money that might be needed for clean-up or mitigation of damages.
- *Implement a comprehensive closure and reclamation program.* Planning for reclamation after the mine has closed should begin in the earliest stages of an operation. The goals of a reclamation program should include preventing future contamination, minimizing ecological change and returning the land to a comparable state of productivity or naturalness as before mining

began. Revegetation should be done with native species only, and thorough monitoring should continue for many years after the mine has closed, to detect and address any potential contamination.

- *Involve and consult with local stakeholders at all stages of an operation.*
Communication with local communities is an essential part of a successful social program. This consultation program should be two-way and inclusive, and communities should have access to clear and accessible information throughout the project. The program should also include cross-cultural training for both the communities and company representatives, to ensure that all parties reach a mutual understanding on their respective views.
- *Provide appropriate economic compensation and support to local communities.* Any compensation or support should be appropriate to the community's degree of economic development and social structures. This can include hiring and training of local people and support for local businesses. Development should be done within a long-term context, in order to remain viable after the mine has closed.
- *Develop strategic, long-term land-use plans.* Governments can work closely with companies, communities and other stakeholders to develop land-use plans that consider geologic, ecological and cultural priorities for a specific region or even the entire country. This planning should include the designation of areas that are too environmentally or culturally sensitive to allow mineral development.
- *Increase government capacity through training and institutional reform.* The effective guidance and regulation of a national mining sector depends on the ability of government agencies to properly carry out their roles. Capacity-building includes training in mining, environment and social issues for all relevant officials. In addition, clarification of the roles and responsibilities of each agency that is involved in overseeing the performance of the mining industry will help to increase effectiveness and promote intra-governmental communication and cooperation.
- *Enact comprehensive environmental, social and mining legislation and regulations.* Legal requirements for environmental and social standards should be clearly laid out in legislation for each subject. These laws will complement mining codes that deal more specifically with the technical aspects of mining operations. Included as part of all legislation should be clear and transparent arrangements for which agencies have jurisdiction over which issues, and a comprehensive monitoring and enforcement program to ensure effective implementation and suggest opportunities for improvement.
- *Use financial and economic tools to promote responsible mining.* In addition to the more traditional tools of direct regulation and penalties for non-compliance, governments may use financial and economic tools that provide a positive incentive for companies to comply with regulations and environmental and social management plans. These tools, which may

include performance bonds, trust funds and offsets, are more flexible than traditional control mechanisms and have the added benefit of ensuring available funding for conservation or community development.