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FOR

MINING

AND

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SECTION 1

COMPENDIUM OF GUIDELINES FOR MINING AND SUSTAINABLE DEVELOPMENT

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he United Nations Conference on Environment and Development (UNCED), held in Rio de Janeiro in June 1992, adopted Agenda 21 as the programme for sustainable development for the 21st century. Agenda 21 emphasized the need for guidelines for natural resources development. Five years later, at the special session of the United Nations General Assembly to review and appraise the implementation of Agenda 21 held in New York (United Nations Earth Summit + 5), member states reaffirmed their belief that the comprehensive implementation of Agenda 21 remains important.

In recent years, the Department of Economic and Social Development and its Division for Sustainable Development and the United Nations Environment Programme (UNEP) have received requests from a number of countries to provide guidance for mining and sustainable development. The first edition of *Environmental Guidelines for Mining Operations* was published in 1994, as a useful outcome to the 1991 Berlin Round Table on Mining and the Environment organized by the United Nations and the German Foundation for International Development (see Appendix 1).

Since the publication of the first edition of the *Guidelines*, continuing changes have occurred within the mining sector—particularly in the evolution of legal, fiscal and regulatory policies, accompanying the trend of liberalization and privatization of the industry. Among other things, environmental conditions attached to credit and insurance have raised the profile of environmental planning and management of sustainable development. There have also been major advances in voluntary actions by industry and the standardization of environmental management systems.

During this period, significant advances have been made in defining and promoting best practices in the sustainable management and operation of mining projects. These advances have often been stimulated by the attention of pressure groups, the media, and public opinion. Many of the major mining companies have now started to work in partnership with regulators and the local communities to maximize corporate, national and community benefits, while minimizing the social and physical impacts.

In the policy arena, national and international conventions and standards, corporate trends, voluntary industry codes and the increasing use of environmental management systems have also contributed to changes in the regulation of the mining sector. This second edition of the Guidelines builds on the first, reflecting these changes and looks at them in the context of developments in more formal legislation.

These Guidelines address:

- mining and sustainable development;
- regulatory frameworks;
- environmental management;
- voluntary undertakings; and
- community consultation and development;

as applied to all stages of a mining operation comprising:

- exploration;
- operation;
- decommissioning; and
- closure and rehabilitation;

and include a section on small-scale and artisanal mining.

The increasingly integrated and collaborative nature of sustainable development programmes means that all those involved—governments, companies, labour unions, communities and non-governmental organizations (NGOs)—need to understand the interlocking nature of the various individual tools and concepts described in these Guidelines. It is also essential that different government departments at all levels work together in close cooperation to achieve a project that brings long-term gains to the region and the country while minimizing environmental and social costs.

The information contained in these Guidelines consists of recent examples of environmental legislation and management practices from countries around the world, which have an existing mining industry. Many of the examples reflect the legal and administrative context of the country from which they are drawn. As such, they should not be taken as blueprints simply to be copied elsewhere, but should be adapted to suit country-specific conditions. Each country must decide for itself how to construct and implement its own regulatory framework.

These Guidelines are intended to provide general guidance for sound and sustainable management and are not a prescriptive manual. They should be amended and improved according to the specific needs of each country. They are meant to be of assistance to regulators, practitioners, managers, government officials, mining companies and others interested in the mining industry.

Mining can be an important part of national development plans and can contribute significantly to the economic well-being of developing countries—a point emphasized in the 1990s by the adoption of new or modified mining policies and legislation in more than 75 countries. These changes have, for the most part, been undertaken to promote foreign investment and to create a stable fiscal and regulatory climate that is conducive to the development of mining activity.

In addition to contributing to the economy, mining can also be a major source of degradation of the physical and social environment unless it is properly managed. These Guidelines are designed to assist policy makers, particularly in developing countries, to encourage mining that promotes sustainable development. The fundamental principles, to which all involved in mining are encouraged to subscribe, were outlined in the 1991 Berlin Guidelines (see Appendix 1). These principles concentrated mainly on the technical and physical aspects of environmental management and have been updated to reflect concerns for social, community and gender issues. The revised principles are shown in the box below.

Best environmental management practice is a process of continuous improvement, which enables individual operations to raise their performance over time. These improvements may be driven by changes in legislative requirements, public expectations, corporate thinking, or by the development of new and improved technology.

Minimizing the impact of a mining operation ideally depends on sound management practices developed within a framework of good environmental legislation. These Guidelines, and the supporting documents, highlight what can be done in terms of regulation, administrative control and mine management to achieve an acceptable level of environmental performance. Training programmes can help to ensure that both government officers and mine staff are familiar with key aspects of these procedures. These Guidelines, the supporting documents and bibliography can be a basis for such programmes. If necessary, UN agencies can further assist countries to organize training programmes.

Fundamental Principles for the Mining Sector (Berlin Guidelines 1991, revised 2000)

Governments, mining companies and the minerals industries should as a minimum:

1. Recognize environmental management as a high priority, notably during the licencing process and through the development and implementation of environmental management systems. These should include early and comprehensive environmental impact assessments, pollution control and other preventive and mitigative measures, monitoring and auditing activities, and emergency response procedures.
2. Recognize the importance of socio-economic impact assessments and social planning in mining operations. Social-economic impacts should be taken into account at the earliest stages of project development. Gender issues should also be considered at a policy and project level.
3. Establish environmental accountability in industry and government at the highest management and policy-making levels.
4. Encourage employees at all levels to recognize their responsibility for environmental management and ensure that adequate resources, staff and requisite training are available to implement environmental plans.
5. Ensure the participation of and dialogue with the affected community and other directly interested parties on the environmental and social aspects of all phases of mining activities and include the full participation of women and other marginalized groups.
6. Adopt best practices to minimize environmental degradation, notably in the absence of specific environmental regulations.
7. Adopt environmentally sound technologies in all phases of mining activities and increase the emphasis on the transfer of appropriate technologies that mitigate environmental impacts, including those from small-scale mining operations.
8. Seek to provide additional funds and innovative financial arrangements to improve environmental performance of existing mining operations.
9. Adopt risk analysis and risk management in the development of regulation and in the design, operation, and decommissioning of mining activities, including the handling and disposal of hazardous mining and other wastes.
10. Reinforce the infrastructure, information systems service, training and skills in environmental management in relation to mining activities.
11. Avoid the use of such environmental regulations that act as unnecessary barriers to trade and investment.
12. Recognize the linkages between ecology, socio-cultural conditions and human health and safety, the local community and the natural environment.
13. Evaluate and adopt, wherever appropriate, economic and administrative instruments such as tax incentive policies to encourage the reduction of pollutant emissions and the introduction of innovative technology.
14. Explore the feasibility of reciprocal agreements to reduce transboundary pollution.
15. Encourage long-term mining investment by having clear environmental standards with stable and predictable environmental criteria and procedures.

2. MINING AND SUSTAINABLE DEVELOPMENT

The Brundtland Commission's (1986) vision of sustainable development is to meet the needs of the present generation without undermining the capacity of future generations to meet their needs. Since the concept was established, many people have tried to come up with a short, clear definition of "sustainable development", which does justice to everyone's views, encompasses social complexity and incorporates the insights of science. A very useful and important way to look at sustainable development is as a process. This process involves the economic, social, cultural and environmental dimensions of human existence.

While mining by its nature, extracts resources from the land, it can be carried out in a more sustainable manner by making sure that the removal of the resource is carefully managed. Most mining projects involve a short-term use of the land and extraction of the underlying resources for the purpose of development. In light of recent technological developments, this means that in most cases there is no reason for a mining operation to leave unmitigated impacts on the environment. If it does, it means that the project has not been properly managed.

Building human and social capital by reinvesting the interest from the revenues generated by a mining enterprise is very different from the old "company town" approach, where mining companies provided the physical infrastructure for communities surrounding the mine site.

Taking the time and resources to gain a good understanding of the local situation can pay off in the long term, though it does not guarantee success. Where governments and mining companies are indifferent to human and social capital, or where they actively undermine existing social structures and bonds, a mining project can create extensive and long-term damage. One example is the behaviour of many mining companies towards small-scale miners. The general view is that they are a "nuisance" and should be expelled from the mining lease. However, some companies tolerate their presence while others work with them to form legal associations that apply sound environmental health and safety standards to the benefit of all involved.

In addition to Environmental Impact Assessment (EIA) (see Section 6.3), governments and mining companies now carry out a Socio-Economic Impact Assessment (SEIA) (see Section 6.4), which acknowledges the legitimacy of all stakeholder perspectives. Some companies have already established “community policies” which commit them to developing a relationship of mutual understanding and respect with the local people. Socio-Economic Impact Assessment is a method of including all interested parties in the design and implementation of a project.

If sustainable development is defined as the integration of social, economic and environmental considerations, then a mining project that is developed, operated and closed in an environmentally and socially acceptable manner could be seen as contributing to sustainable development. Critical to this goal is ensuring that benefits of the project are employed to develop the region in a way that will survive long after the mine is closed.

3. REGULATORY FRAMEWORK

The role of national government is to provide a well-designed legislative framework for the mining industry that includes all aspects of the environment, both physical and social. From the regulator's perspective, a clear-cut and enforceable framework is essential to effectively control the activities of the industry. From the industry viewpoint, it is important to have a regulatory system that is stable, transparent and appropriate to the conditions of the country in terms of priorities, infrastructure and skills.

There are a wide variety of physical and environmental issues that need to be addressed by legislation if they are to be acceptably managed. The socio-economic issues that need to be covered are discussed in Chapter 6, Section 4. The range of legislative systems to be found in different countries has resulted in a diversity of methods for allocating the responsibilities of these issues among mining, environmental and other laws. No two countries possess exactly the same framework and only a general overview of the possibilities can be outlined in this document. Some regulatory models are given in the Appendices. Each country will need to adapt these Guidelines to suit its own circumstances.

The number of issues now included under the "sustainable development" rubric means that a wide range of laws and regulations may apply to the physical, social, environmental and economic management of a project. Each country needs to assess the level of regulatory legislation generic to all industries, and how much should be specific to the mining industry. In addition, the administrative arrangements for enforcement tend to be complex because the division of responsibilities among different government departments and among national, provincial (or state) and local levels of government is seldom straightforward. There is unfortunately no ideal system and a country has to establish its own procedures, based on individual priorities and circumstances.

3.1 Legislation

3.1.1 Mining Legislation

The politically sensitive nature of the mining industry, due to issues such as state sovereignty, ownership and control, environment, community impact, sustainability, depletion and site dependency, has led most countries to develop regulatory and fiscal systems distinctly different from those that regulate most other industrial activities. A “mining law” is the principal regulatory instrument governing mineral exploitation activities and it defines both the rights and obligations of the mining title-holder and the power of government officers. The government’s first role is to regulate the industry at all levels, including domestic exploration and exploitation or extraction, as well as primary mineral processing. However, many mining laws, or the associated implementing rules and regulations, either state that the holder of an exploration or mining licence must comply with all other relevant laws or include a number of environmental provisions.

While mining laws are rarely specific enough to allow for broad environmental programmes, many now incorporate the requirement for one or all of the following:

- an environmental impact assessment or environmental impact statement;
- an environmental management plan;
- a rehabilitation programme;
- a rehabilitation or restoration fund.

Some also include the stipulation that a decommissioning plan and/or a closure programme must be outlined early on in project planning. Many of the environmental clauses contained in the mining law overlap with the environmental legislation, though the latter are usually generic to all activities and contain a more precise description of the requirements.

There is a growing trend for countries to draft specific environmental regulations for the mining industry. However, this often creates conflict between the mining and environment ministries or departments regarding which one should be responsible for their implementation. Appendix 5 provides a reference to the environmental guidelines for mining projects in Western Australia where the responsibilities are shared between the two departments.

3.1.2 Environmental Legislation

Environmental legislation has moved from comparative obscurity to prominence in a relatively short time. Many of the issues that are now collectively referred to as “environment” were originally dealt with in separate laws, with the emphasis on human health and pollution prevention. The shift in thinking towards “environmental management” has resulted in the majority of countries adopting some form of general environmental law. In most cases these new laws were added to the existing legislation, though some countries are now starting the process of amalgamation. For example, Papua, New Guinea, is in the process of drafting a new Environment Act, which will replace the existing Environmental Planning Act, Environmental Contaminants Act and the Water Resources Act.

The most common model is for a country to establish an environmental planning or environmental management law, which acts as a framework for the environmental management of the country and is administered by a specially created ministry or department. The individual instruments of environmental management, such as prescribed activities and environmental impact assessment, are then specified in associated regulations and guidelines. However, most of the environmental laws are generic in nature and do not specifically outline the unique environmental requirements of the mining industry.

In order to integrate the requirements of the mining law and the environmental law, a number of countries have drafted specific environmental regulations for the mining industry. These are usually established under the environment law and designed to include all the aspects of environmental management that come under the jurisdiction of that act such as:

- environmental impact assessment/statement;
- socio-economic impact assessment;
- environmental management plan;
- environmental monitoring programme;
- environmental audits;
- environmental reporting;
- rehabilitation programme;
- mine closure;
- compensation;
- fees and charges; and
- financial surety.

Other issues such as water usage, waste disposal, air emissions and the control of hazardous substances are commonly regulated by separate legislation and are discussed in more detail in the next section. Where the mining law also covers the same issues, the environmental or associated legislation usually takes precedence.

3.1.3 Other Legislation

A number of issues pertaining to the environment and relevant to the management of a mining project are frequently contained in separate legislation. The following examples give an idea of the range and scope of this legislation but it is by no means an exhaustive list.

Land law: deals with the acquisition, disposal, use, protection and management of state-owned land.

Conservation law: was often the first “environmental protection” legislation and includes the preservation of fauna and flora and areas of specific scientific interest.

Forest law: looks at the protection and use of forested areas and often includes a provision for establishing national parks and reserves.

Water resources law: usually covers both surface and ground water but does not include the sea or ocean. This law is aimed at regulating the uptake or usage of water and discharge of effluent to natural watercourses. Water quality criteria or standards are often established under this law.

Air quality law: regulates the discharge of atmospheric emissions. Air quality criteria or standards are often established under this law.

Hazardous substances law: controls the transport, storage and disposal of any hazardous substances from hydrocarbons through to cyanide.

Radioactive substances law: regulates the transport, storage and control of radioactive substances and often includes the disposal of radioactive waste.

3.1.4 International Conventions

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In recent years, the number of international conventions aimed at protecting the environment has increased significantly. They deal with an ever-widening range of issues on which global action has been deemed necessary. Conventions now cover not only issues of biodiversity, world heritage and biosphere reserves, migratory species and wetland conservation, but also pollution and waste issues such as hazardous chemicals and the dumping of waste at sea. These conventions are notable for the use of trade restrictions as well as outright bans on certain substances, and many have implications for the mining industry. For example, the growing use of deep-sea tailings disposal should take into consideration the Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matters.

In addition to international environmental conventions, there are also the International Labour Organization and other conventions that provide for the protection of workers, women and children.

Although conventions are meant to be “legally binding”, they often have no mechanism for ensuring compliance. Conventions are intended to oblige governments to pass national legislation to implement their commitments.

3.2 Instruments for Implementation

The nature of the relationship between the regulator and the operator can vary significantly, from collaborative to confrontational. Where a regulatory body exerts greater control, it also accepts a greater level of responsibility. This may inhibit continuous improvement on the part of the operator, thereby undermining one of the principles behind sustainable development. In order to provide a more balanced approach to both physical and social environmental management, the concept of cooperation and co-regulation is now being applied in some countries. This may also involve the community and NGOs as well as the relevant government agencies and the company.

In the past, governments tended to use command-and-control or prescriptive systems that limited the options for the industry. However, prescriptive legislation can be costly to implement. It also requires an appropriately trained enforcement team, extensive and regular monitoring of operations, analytical and data evaluation support and an effective judicial system to administer fines and penalties. Government authorities are now using a variety of other regulatory approaches to overcome these limitations. However, none of these alternatives used alone is able to address all situations. In practice, a mixture of regulatory instruments is now advocated in order to provide the most suitable response to national needs.

Among the co-regulatory alternatives are:

- performance targets (Section 3.2.3);
- economic instruments (Section 3.2.4);
- negotiated or voluntary agreements (Section 3.2.5); and
- environmental management systems (Section 4.1).

3.2.1 Prescriptive vs. Non-Prescriptive

Prescriptive legislation provides absolute values or standards, which are set by the relevant government department or agency, which must be met at all times. They are relatively simple to put in place and provide a measured response to the question of compliance. They are typically “media” specific and usually are not related to the industrial process being controlled or to the existing environmental conditions of the particular area. Prescriptive legislation can be highly successful in reducing pollution from certain industries but in the mining sector there are both advantages and disadvantages in the use of such an approach.

Large mining operations lack the degree of standardization present in other sectors such as manufacturing. Therefore, the standardized requirements, which are an integral part of the prescriptive system, may result in reduced efficiency resulting in under-protection at some sites and unnecessary over-protection at others. This can mean that the operator concentrates all efforts on meeting those standards, and proving compliance, rather than being forced to think about the process itself. This promotes standardized technological solutions that do not necessarily deliver the optimum environmental or economic performance.

In contrast, non-prescriptive legislation relies on the operator identifying the issues and making the management commitments to deal with them. The operator needs to be aware of the environmental issues and to develop a knowledge and understanding of what is expected from the outset. The methods of achieving these requirements can then be built into the overall management of the project. This provides the opportunity to develop the process and procedures and to identify suitable standards on a site-by-site or case-by-case basis. The flexibility of this approach is advantageous because environmental issues tend to fit no one model and are often full of contradictions.

On the other hand, this method of regulation can provide the operator with the opportunity to understate or hide issues that may be environmentally critical. Ill-defined standards and issues are difficult to measure and open to individual interpretation and persuasive argument. In addition, standards can vary considerably among sites for no apparent reason, which could lead to confusion on the part of project personnel. It also means that compliance or non-compliance often is unclear, leaving the regulating agency unsure of its role.

The prescriptive vs. non-prescriptive debate is more often than not linked to the decision of which government department or agency is responsible for the environmental management of the mining industry. If the Department of the Environment or Environmental Protection Agency has the responsibility, it will, as a general rule though there are exceptions, impose a highly prescriptive regime with standards, criteria and penalties for every eventuality. In contrast, if the Department of Minerals and Energy is in control the tendency is usually to take a more non-prescriptive approach, preferring to negotiate with the operator and taking economic as well as environmental aspects into consideration. For these reasons a mixture of regulatory agencies is likely to be the optimal option.

3.2.2 Standards and Criteria

A standard is a reference norm against which performance can be measured. In environmental matters, standards or criteria are developed to regulate the discharge of pollutants to the natural environment. They provide the numerical limits to which industrial operations must be designed and managed. Unfortunately, many standards are established using little science and much guesswork. It is common practice for a country to base its standards on those of another country with little or no reference to the existing conditions. This can result in the natural environment exceeding the standards without any contributing industrial emissions. However, standards are an essential tool for a regulator that wishes to employ (at least in part) a command-and-control or prescriptive approach to environmental management, but they should be used with caution (see the previous section).

Environmental standards (or criteria) are normally established in regulations or guidelines subordinate to environmental legislation. The most common environmental standards are water quality standards, air quality standards and noise quality standards. There are no environmental standards that apply around the world, although the World Bank has established recommended target guidelines for water and air quality for the mining industry and the World Health Organization (WHO) produces guidelines for drinking water quality (see Appendix 6 (a)). These guidelines are often copied into national laws even though each country has its own needs and circumstances and should set its own standards accordingly. Indeed, in many cases it is necessary or desirable to have standards specific to a particular site.

3.2.3 Environmental Performance Targets

Environmental performance targets are one of the instruments available to regulators using a non-prescriptive approach. They are based on the receiving environment and the most appropriate technology, and are expected to show a gradual but continuous improvement in overall environmental quality. The choice is left to the operator, who is assumed to have sufficient expertise to make sound, well-informed decisions. Performance targets are also seen as locally responsive because they can take into consideration site-specific conditions (the assimilative capacity of the environment, background concentrations of contaminants, etc.). Performance targets differ from quality objectives in that they try to define the behaviour of industrial operations rather than the characteristics of the natural media.

Such an approach assumes that there is an effective regulatory and enforcement framework already in place and that legal recourse, in cases of non-compliance, is feasible. Where sufficient resources are not available, independent monitors trusted both by the government and the operator (and preferably the community, as well) could be employed to monitor compliance.

3.2.4 Economic Instruments

Economic instruments can be used in both prescriptive and non-prescriptive regulatory regimes, as a method of providing funds for the regulatory agency and/or as an incentive to improve environmental management. In a prescriptive situation, fees or charges can be levied for a number of stages in the regulatory process, such as the submission of an environmental impact statement or the issuing of an environmental permit. These fees are usually set at a fixed rate regardless of the environmental implications of the project and provide no incentive for a company to improve its performance.

The setting of fees and charges in a non-prescriptive situation essentially reflects the polluter-pays principle, where a company may be charged for the abstraction of water or the discharge of effluent. These charges are based on the quantity and/or quality of the specified substance and, as such, encourage a reduction in usage or discharge. While some critics claim that this method of environmental management is in reality a licence to pollute, under the right circumstances, economic instruments have been very successful in developing as well as developed countries.

A third alternative is to establish an optimal level of pollution, which is defined as the point where the cost of waste removal is equal to the external cost, based on the assimilative capacity of the environment. Charges would be set at this optimal level which would give the company the maximum freedom of choice under conditions of economic efficiency while minimizing the net social cost. If the optimal level is exceeded, then a fine could be charged to ensure compliance.

3.2.5 Voluntary Agreements

Voluntary agreements, covenants and other instruments sometimes described as self- or co-regulatory, are finding an increasing role in the regulatory system. The advantage of voluntary mechanisms is their high degree of flexibility, allowing companies to find the most cost-effective solutions for each individual case. Their disadvantage is their inability to ensure that all companies comply (enforcement mechanisms are rarely built into voluntary agreements), and the fact that non-signatory parties are not bound by the agreements. Nevertheless, programmes such as the ARET (Accelerated Reduction/Elimination of Toxics) and MEND (Mine Environment Neutral Drainage) programmes in Canada, and the Greenhouse Challenge Programme in Australia, demonstrate that sector-wide voluntary programmes can produce impressive results in some areas.

Voluntary agreements and control are discussed in more detail in Section 4.

3.3 Financial Surety

The regulatory authority is usually ultimately responsible for the cost of treating the environmental problems created by the abandonment of a mine site. As a result, it is becoming common practice for some form of financial surety or rehabilitation bond to be established prior to project approval. This provision is designed to guarantee environmental performance and to cover both the technical and/or financial failure of mine operators to meet their full obligations at the time of closure or in the event of an unplanned closure.

Governments establish financial sureties in order to protect the environment and avoid the costs of cleaning up orphaned sites. However, the cost of a surety can be significant and could deter a potential mining investor. It is therefore necessary for the government to have a good understanding of the issues involved in the design and application of a financial surety policy. The following issues should be considered:

Required standard of rehabilitation: the standard of rehabilitation will affect the cost and therefore the amount of financial surety. A requirement that land be returned to its pre-mining condition is not always realistic although rehabilitation for future economic use should be an option.

Required standard of certainty: forecasting rehabilitation costs is an inexact science. Safety factors should take into consideration reasonable foreseeable risks rather than extremely unlikely events.

One-off rehabilitation vs. long-term care: some sites can be successfully rehabilitated at the end of mine life while others may require long-term care. The long-term care costs can be substantial, and it may be advantageous to implement a graduated or incremental system of commitment.

The choice of financial surety instrument: there are a number of options available for establishing a financial surety, as follows:

- ***Irrevocable Letter of Credit:*** an agreement between the company and the bank whereby the bank will provide cash funds to the authorities if the company defaults.
- ***Performance Bond:*** a surety bond issued by an insurance company in which the insurer is responsible for all claims up to an agreed limit.
- ***Trust Fund:*** a fund that operates in a similar fashion to a pension fund with regular contributions being invested by a fund manager.
- ***Insurance Policy:*** a special form of performance bond.
- ***Parent-Company Guarantee:*** the parent company guarantees to indemnify the government in the event of a company default.
- ***Pledging of Assets:*** The company assets are pledged to the government.
- ***The Timing of a Requirement for Financial Surety:*** a financial surety should be established early in the life cycle of the mining project and should be reviewed on a regular basis.

For some mine operators, the amount of financial surety is established during project negotiations and is based on the information contained in the environmental impact statement and is an estimate of the closure and rehabilitation costs. Another method is for the mine operator to be charged a levy on every tonne of rock/ore mined/processed or every tonne of concentrate/metal produced.

The financial surety should be available to either the mine operator or the relevant regulatory authority, to pay for rehabilitation. If the mine operator defaults, the money remains in the hands of the regulatory authority. Once all stages of rehabilitation have been completed, including the passive care programme, the remaining funds may be returned to the mine operator.

Whichever method is used to establish a financial surety, it is essential that it be regularly assessed, as part of the environmental management of the project, and increased or decreased as necessary. Contributions to a financial surety are, in some countries, tax-deductible.

3.4 Enforcement

While all instruments promoting behavioural change need some monitoring, those based on specified requirements necessitate an effective and regular enforcement mechanism if they are to be successful. Traditionally, an environmental or mining inspectorate has been charged with monitoring and enforcement. However, the resources needed for the increasingly complex legislative requirements that are now required for the environmental management of a project are not always available. Accordingly, new approaches to enforcement are being tried out at the same time as training and institutional strengthening is being sought to support the more conventional functions of the enforcement agency.

A particularly significant question concerns the responsibility for enforcement of the environmental regulation of mining. The environmental agency does not necessarily possess the expertise in mining while the mining department does not always have a background in environmental issues and can suffer from a conflict of interest. Practical resource allocation increasingly favours a division of functions; the environmental agency is responsible, in consultation, for establishing policies, law and standards while the mining department undertakes the management and enforcement. This arrangement is also compatible with the concept of “cleaner production”, where the mine inspectors can directly oversee the company approach to pollution avoidance. However, the environmental inspection function is not abandoned and there remains an important monitoring role for environmental agencies to collect information and confirm that enforcement is consistent with overall policy and standards. Close liaison among the various government departments is essential.

In countries with a federal government structure it is common for environmental enforcement roles to be delegated to the provincial (or state) and/or local government. The central government still maintains the overall control and management of the project while the regional government, which is often more in touch with the local situation, is responsible for the day-to-day monitoring and direct liaison with the company and the local community. Some countries have elected to place a full-time enforcement officer at each major project who, if given the proper training, can work closely with the company to ensure compliance and improvement in environmental performance at the same time as improving cooperation and consultation with all levels of government and the local community.

Whatever arrangement is adopted, compliance with environmental standards and legislation may be ensured by mechanisms such as:

- imposing civil liability on mining operators;
- compulsory insurance or payment into an environmental guarantee fund to pay for damages and compensation;
- financial surety (see Section 3.3); and
- incentive measures to maintain environmental standards in the absence of specific regulations.

These measures all require some degree of inspection and enforcement by the competent authorities and fines or sanctions of sufficient importance to dissuade non-compliance.

There is relatively less experience with enforcement of the newer environmental management instruments such as environmental management systems. Much depends on the monitoring and auditing arrangements since these instruments impose an information system, rather than a fixed standard that can be easily checked in the field for compliance or non-compliance. The skills required by inspectorates under such regulatory regimes are quite different from the traditional field skills. On-line data transmission, regular monitoring of operational rather than environmental parameters, and strict incident reporting are among the new measures being applied.

The growth in the use of voluntary agreements is also putting pressure on industry associations to monitor and report on the activities of their members; a role with which many are unfamiliar. In the future, sector-wide reporting can be expected to become more common to supplement the corporate environmental reports now being published by major companies.

Government agencies are also starting to use consulting services in enforcement. For example, in Western Australia, not only are project EIAs prepared by consultants, the evaluation of the assessment reports is now being handled by accredited assessors rather than by the government agencies directly (see Appendix 5). A key new role for the agencies is now checking the credentials of assessors.

All enforcement mechanisms rely on adequate monitoring and data collection. This aspect is discussed in Section 6.6

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he mining industry operates in a highly dynamic business climate that increasingly demands successful adaptation to changes in social values and public expectations of corporate behaviour. At the corporate level, respect for both the physical and social environment is now considered to be an essential element of good business practice. Most major mining companies are now committed to the continuous improvement of their environmental performance, often going beyond the legal requirements, to include voluntary industry codes of practice and management systems. In addition, many international organizations, such as the UN, the World Bank Group and WHO, and financial institutions now have their own operating guidelines that include environmental and social issues.

Developing and signing up to voluntary codes is helping companies to gain greater public acceptance of corporate activities. However, it also requires a more open and proactive dialogue with a wider variety of interest groups. Corporate environmental reporting is rapidly becoming the preferred method for the voluntary public disclosure of information about a company's impact on the environment, its performance in managing that impact and its contribution to ecologically sustainable development. Environmental issues are increasingly being linked with a much broader and more complex set of political and social issues including community development and corporate responsibility. Corporate social reporting is also growing as a voluntary method of disseminating information about a company's social value and activities.

4.1 Environmental Management Systems

The majority of mining companies are increasingly concerned about achieving and demonstrating sound environmental performance to the public. Companies attempt this by undertaking internal reviews and audits to assess their environmental progress. However, these internal checks cannot provide any assurance that a company's performance meets, and will continue to meet, legislative and policy requirements. An Environmental Management System (EMS) seeks to integrate environmental responsibilities into every-day management practices through changes to organizational structure, responsibilities, procedures, processes and resources, thereby continuously improving the level of environmental performance.

The concept behind an EMS is to guarantee a certain standard of operation as a starting point and continuous achievement as a goal. It provides a structured method for company management and the regulating authority to have an awareness and control of the environmental performance of a project that can be applied at all stages of the life cycle from identification of a deposit to mine closure. The stages in an Environmental Management System cycle are:

- **Organizational Commitment:** the most important component of an EMS and often the most difficult to achieve. Commitment is essential at all levels of the company, from the top-level management to the labourer, because they all have a role to play.
- **Environmental Policy:** a public statement of the company's intention with respect to the environment, both social and physical.
- **Socio-Economic Impact Assessment:** the findings of the SEIA form the basis for ensuring that the benefits of the project are sustainable, and that negative impacts are minimized.
- **Environmental Impact Assessment:** the findings of the EIA form the initial objectives and targets that the company must achieve and procedures they need to implement.
- **Community Consultation:** the community includes the relevant government authorities, the immediate inhabitants of the area and any other communities that may be impacted by the project. Consultation and coordination should be undertaken at all stages of a project, before, during and after, to ensure that all concerns are adequately addressed.
- **Objectives and Targets:** these include:
 - performance levels;
 - compliance with regulations;
 - reduction of environmental impacts;
 - recycling of non-mine waste materials;
 - internal savings (e.g. water use reduction); and
 - easy public access to information.
- **Environmental Management Plan:** the methods and procedures by which the company will achieve the environmental objectives and targets.
- **Documentation and Environmental Manual:** containing all the environmental strategies, policies, responsibilities and procedures, clearly laid out and easily accessible.
- **Operational Control and Emergency Procedures:** all site operational and emergency procedures need to be identified and documented.
- **Training:** in order to ensure that there is total organizational commitment to the environment, all staff and operational personnel should undergo an environmental awareness course with specialist training for their specific area. This training needs to be updated and refreshed on a regular basis.

- **Emissions and Performance Monitoring:** regular reviews to ensure that the desired environmental outcomes are being achieved.
- **Environmental and Compliance Audits:** audits are a critical part of an EMS and the quality of the audit determines the quality of the system.
- **Reviews:** a review of the EMS should take place after the audit to ensure that the system is achieving or exceeding the company's environmental policy.

The EMS is a repetitive cycle with each stage being continuously re-visited and improved on each visit. Although it is designed as a tool for the company, an effective system provides an easy way for the regulatory authority to check compliance. The responsibility for setting up and running an EMS lies with the company. It can be done "in-house", if there are available trained personnel, or through the services of consultants and specialists.

Most companies wishing to implement a formal EMS do so with the intention of seeking some form of accepted certification that will provide a means of confirming the company's environmental credentials. The two primary schemes under which accreditation can be achieved are:

- International Standards Organization — ISO 14001
- EU Eco-Management and Auditing Scheme — EMAS

The most significant difference between the systems relates to the amount of detail that must be published to gain accreditation. Under ISO 14001 there is a requirement to publish an environmental policy and environmental objectives. No other information needs to be made publicly available. These policies and objectives are established by the company itself, rather than by an outside body, though they are assessed by the external certifiers and do have to take into account relevant environmental legislation and regulations. Under EMAS there is a requirement to publish a formal environmental statement relating to the registered organization, site or enterprise. The aim of this is to make the environmental management process more transparent and to provide an opportunity for external evaluation of potential impacts and management procedures.

EMAS includes the mechanisms for reviewing potential environmental impacts rather than reviewing the procedural aspects of an EMS. However, the requirements of ISO 14001 do not prohibit the incorporation of procedures for the continuous evaluation of environmental impacts. The success of the EMS depends largely on commitment from all levels of an organization and, in particular, from the highest levels of management. Certification of a formal EMS does not provide an absolute standard or measure of environmental management quality. Two identical projects, both certified under a formal scheme, could have very different levels of environmental performance, and yet both are in total conformance with the standard.

4.2 Industry Codes and Charters

Most mining companies have adopted corporate environmental policies to demonstrate their commitment to improved environmental performance and to send a clear signal throughout the organization that environmental protection is a corporate priority. These policies are designed to promote the integration of environmental concerns into all aspects of corporate activity, from exploration to the closure of a mining project, and are given the same treatment as economic considerations. Many of the underlying principles of these corporate environmental policies have been adopted and incorporated into a common framework by mining associations for application on an industry-wide basis. Two examples are given below and both of these are given in full in Appendix 2.

At the international level, the International Council on Metals and the Environment (ICME) established an Environmental Charter that was developed and endorsed by its members. The Charter originally encompassed Environmental Stewardship and Product Stewardship and has more recently been expanded to include Community Responsibility principles. The Charter offers members both a direction and a framework for the continuous review and improvement of their environmental performance. Members of ICME are expected to adopt the Charter and to accept the importance of responsibly managing their operations and products and adopting appropriate measures to foster environmentally and socially sustainable development.

At a national level, in 1996 the Minerals Council of Australia launched a Code for Environmental Management on behalf of the Australian minerals industry. This Code was reviewed in 1999 and has recently been revised. In developing the Code, the mining industry recognized that:

- increasingly the community expects excellent environmental performance;
- while the industry's environmental credentials were generally sound in a technical and scientific sense, the public remained largely unconvinced;
- despite the best intentions, and the best management in the world, some environmental incidents have occurred, but the risks must be controlled and minimized; and
- if the industry did not have in place a recognized and respected process for environmental self-regulation, then governments would police it with increasingly prescriptive and restrictive regulations — some of which would be neither environmentally nor economically effective.

The cornerstone objectives for the Code were to facilitate industry-wide improvement in environmental performance, to provide a transparent and consistent framework for environmental management, to strengthen relations with stakeholders and to enhance the community credibility of the Australian minerals industry. It is also seen as important to avoid creating a set of quasi-regulations that would duplicate government requirements. The Code is viewed as a living document, which will be continuously refined and developed.

The revised 2000 Code builds on its predecessor without changing its fundamentals or significantly altering the Code obligations. Signatories of the Code now commit themselves to a series of values, which are:

- integration of environmental, social and economic considerations into decision-making and management, consistent with the objectives of sustainable development;
- openness, transparency and improved accountability through public environmental reporting and engagement with the community;
- compliance with all statutory requirements, as a minimum; and
- a continually improving standard of environmental performance and, through leadership, the pursuit of environmental excellence throughout the Australian minerals industry.

4.3 Corporate Reporting

Many mining companies now prepare voluntary annual environmental reports for release to their employees, shareholders and the general public. These corporate reports give a summary of the environmental performance and compliance for the organization as a whole. Initially voluntary environmental reports were produced in response to public criticism, though they are now seen as a method of enhancing a company's reputation. They are also often a requirement of any voluntary codes and charters to which the company is a signatory (see Section 4.2). However, there is no consistent approach adopted towards the format or level of detail these reports should contain, and companies have total discretion in publishing what they wish.

In recent years many guidelines and checklists have been developed, in an effort to standardize the format and content of voluntary environmental reports, and attempts have been made to "score" the reports that have been produced. It is suggested that sound reports would include at least the following elements:

- company overview including geographical locations, turnover, employees, markets, etc.;
- overview of environmental and social impacts;
- explanation of how the company is addressing these impacts through policies, management systems and targets;
- demonstration of how policies and systems are implemented;
- performance data, preferably related to targets; and
- references to further information, contacts and feedback information.

In addition, non-compliance and non-performance incidents should be reported alongside environmental achievements, and a third party should verify the information.

The Global Reporting Initiative has recently produced the “Sustainability Reporting Guidelines on Economic, Environmental and Social Performance” (June 2000). These Guidelines were inspired by a global need to obtain a clear picture of the human and ecological impact of business, so that informed decisions about investments, purchases and partnerships could be made. Achieving such clarity in measurement and reporting holds the promise of delivering value both to business — by providing a critical management tool — and to external stakeholders — by providing timely, relevant and reliable information on the reporting organization. Paradoxically, this new approach to measuring and reporting business impact has produced a proliferation of inconsistent reporting approaches, and organizations are at liberty to report what they choose about the economic, environmental and social aspects of their performance.

The Guidelines provide a framework for reporting that promotes comparability between reporting organizations while recognizing the practical considerations of collecting and presenting information across diverse reporting organizations. The Guidelines include a section on the suggested content for corporate reports that follows a logical framework, covers all aspects and should facilitate comparability and benchmarking. However, they are generic Guidelines and not specific to one industry.

Voluntary social reporting in the mining industry is an even more recent phenomenon than environmental reporting and occurs infrequently and inconsistently. Social performance is a key ingredient in assuring a company's licence to operate and supports the company's ability to deliver high-quality environmental and economic performance. While there is some agreement on measures for certain dimensions of social performance, they are not as well developed as measures of environmental performance. Social reporting provides an opportunity for the presentation of corporate social policy and provisions, measurement against social performance indicators and the systematic analysis of corporate community involvement.

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4.4 Risk Assessment

Risk assessment and management is becoming increasingly important in the development of a mining project, where the uncertainties associated with environmental (and social) prediction are potentially higher than those of other industrial sectors. The process of risk management incorporates many different elements: from the initial identification and analysis of potential risks; to the evaluation of tolerability and the identification of potential risk reduction options; through to recommendations regarding the selection, implementation and monitoring of appropriate control and reduction measures. Before a risk can be managed it must be analyzed, and this involves a structured process that identifies both the likelihood and potential extent of adverse consequences arising from given activities, facilities or systems. Risk analysis attempts to answer three fundamental questions:

- What can go wrong?
- How is this likely to happen?
- What are the consequences?

Although risk assessment has a wide application in the mining industry, there would be little value in investing in detailed risk analysis if the potential outcomes did not influence the development or operational decision-making. The types of environmental risk that might be considered in relation to a mining development include:

- **Risk of adverse environmental impact:** as an extension of the EIA, risk analysis may be an effective means of estimating the probability that potential events will occur to help in allocating expenditure on environmental mitigation and defining opportunities for monitoring low-risk impacts.
- **Risk of unplanned environmental expenditure:** full assessment of potential environmental risks can be used to quantify possible expenditure on environmental protection in relation to impacts beyond a predetermined level of risk. Identification of potential risks before the start of development and continuously as development progresses allows a higher degree of confidence that financial provision for environmental expenditure is likely to be adequate.
- **Risk of unplanned operational constraints:** unplanned environmental incidents can have a major impact on operational performance due to down-time resulting from the need to remedy adverse environmental effects or the need to change operational procedures as a consequence of unforeseen environmental issues.
- **Social risk:** local communities and interest groups continue to have an increasing influence on the development of new mining projects. Public risk management is a rapidly growing area of risk assessment in the mining industry.

A workshop on Managing the Risks of Tailings Disposal (UNEP/ICME 1997) identified the use of risk assessment as a key to safety and environmental protection in the application of total quality management in planning, design, construction, operation, monitoring and closure. One of the conclusions of the workshop was that there is "a need for more extensive use of risk assessment methodologies" in addressing common issues.

The increasing significance of social issues in the development of mining projects is generating interest in techniques for the more effective incorporation of social considerations in environmental planning. This in turn is creating a demand for reliable procedures for assessing the socio-economic risk as part of the project feasibility assessment and social risk management.

4.5 Institutional Guidelines

A number of international organizations have produced their own environmental guidelines, which are relevant to or specific to the mining industry. These include agencies such as the World Health Organization (WHO), the World Bank Group and the United Nations. In the case of the World Bank, the guidelines are designed to apply to all Bank Group funded projects although they are often used as a benchmark for other projects. Guidelines produced by agencies such as the WHO and the UN are more generic in nature and are intended to provide a worldwide reference point. This section contains a brief description of a selection of the more commonly used guidelines.

The WHO's main concern is with water quality, sanitation and human health. In 1996 the agency produced a revised version of "Guidelines for drinking-water quality, health criteria and other supporting information" with an addendum in 1998. This document includes "Selected Water Quality Guidelines" (see Appendix 6(a)), which are often used as a basis for water quality standards in national legislation. However, when referring to these tables it must be remembered that these are guidelines and not intended to be definitive but should be adapted to reflect existing conditions. They also relate to drinking water and are not directly relevant to industrial discharges.

In July 1998 the World Bank Group approved the "Pollution Prevention and Abatement Handbook" (published 1999), which replaces the 1988 "Environmental Guidelines". The original guidelines were published to provide technical advice and guidance to staff and consultants involved in pollution-related projects. The new Handbook is specifically designed to be used in the context of the World Bank Group's environmental policies, as set out in Operational Policy (OP) 4.01, "Environmental Assessment", and related documents. The guidelines contained in this Handbook are therefore subject to interpretation in the light of the results of the environmental assessment. The Handbook contains a number of industry sector guidelines that specifically relate to the mining sector.

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The World Bank Group, through the International Finance Corporation (IFC) Environment Division, has also produced a good practice manual entitled, "Doing Better Business Through Effective Public Consultation and Disclosure". This manual provides the policy and procedural framework to deal with the need for, and benefits of, consultation with people affected by IFC projects. It is designed to reflect the IFC's private sector mandate and project cycle and is modelled on the World Bank's revised environmental and social policies.

Copies of the new Handbook and the manual can be obtained from:
www.worldbank.org/publications or can be viewed on the Web (www.IFC.org).

In addition to these Guidelines, the UN, through the UN Environment Programme (UNEP), has produced a number of Technical Reports, Training Manuals and Conference Proceedings, that may provide additional guidance to those working in the mining sector. A selection of these documents is listed below:

Mining-related guidelines produced by UNEP*

Technical Reports

"Environmental Management of Nickel Production: A Technical Guide"
(UNEP 1993, TR 15)

"Monitoring Industrial Emissions and Wastes" (UNEP/UNIDO 1996, TR 27)

Proceedings of the Conferences and Workshops

"Development, Environment and Mining" (UNEP/World Bank/UNCTAD/ International Council on Metals and the Environment 1994)

"A Guide to Tailings Dams and Impoundments — Design, Construction, Use and Rehabilitation" (UNEP/ International Committee on Large Dams, 1996)

"Managing the Risks of Tailings Disposal" (UNEP/International Council on Metals and the Environment/Swedish International Development Cooperation Agency 1997)

"Risk Management and Contingency Planning in the Management of Mine Tailings" (UNEP/International Council on Metals and the Environment 1999)

"Industry Codes of Practice: Cyanide Management" (UNEP/International Council on Metals and the Environment 2000)

"Accident Prevention in Mining — Environmental Regulation For Accident Prevention: Tailings and Chemicals Management" (UNEP/Government of Australia 2000)

Training Manuals

"Environmental Management System Training Resource Kit" (UNEP/International Chamber of Commerce/International Federation of Consulting Engineers, 1997)

"Mine Rehabilitation for Environment and Health Protection — a trainers manual" (UNEP/WHO, 1998)

"Environmental Management of Mine Sites — a training manual"
(UNEP 1994 TR 30)

* Some of the above documents and an up-to-date publication list are available at:
<http://mineralresourcesforum.unep.ch> or www.natural-resources.org/environment/

5. COMMUNITY CONSULTATION AND DEVELOPMENT

Community consultation, participation and development are all important in the process of establishing, operating and closing a mining project that is not only financially successful, but environmentally and socially responsible as well. They are also part of ensuring that the mining project is promoting sustainable development (see Section 2). Consultation enables the company to identify the concerns of the community and to take these into account in the planning and development of a project. It establishes a relationship between the company and its neighbours, which should increase understanding and trust and avoid unpleasant surprises. Participation means that the community is involved directly in the decision-making process. Community consultation and participation is a necessary part of any environmental management system: not just because the community is part of the environment affected by a project, but also because they can add sensitivities and information invaluable to achieving best practice. The process can also ensure the maximum economic benefits and development for the community.

The main questions asked about consultation are: when should the consultation process begin and end; who should be involved; when should consultation become participation; and what topics should be discussed. In Australia, for example, the law requires a mineral explorer to consult directly, and early, with any people or group its work will affect. When applying for a prospecting or exploration licence, the applicant must usually advertise its intent in the local newspaper, contact landowners and occupants, local government and others with an interest in the area, particularly Aboriginal communities. The extent and detail of the consultation is often left to the discretion of the proponent. However, the community needs to receive enough information about a project so that they are able to contribute to the decision-making process. They should also understand the process of the decision-making. If they understand the process they will know the full extent of their own influence and the best ways to contribute.

The World Bank “Pollution and Prevention Handbook” (1998) outlines the following general practice pointers as a guide to the consultation and participatory process:

- Start the participatory process as early as possible in the project design.
- Ensure government support for a participatory approach.
- Identify and then involve the stakeholders.
- Involve intermediary NGOs who have local credibility.
- Identify and involve responsive individuals or agencies in government.
- Build community capacity to make decisions and to convey information back and forth.
- Make a particular effort to understand the concerns of the poor, who are often not well represented.
- Facilitate women’s participation, as they may not be represented in the formal structures.
- Consider institutional or regulatory measures to support participation.

Consultation and listening are essential prerequisites for participation. Community consultation and participation require the support and collaboration of all the players involved in the development of a mining project. Initially they need to conduct an analysis and diagnosis of the strengths and weaknesses of existing policies and service and support systems. They then need to decide what is required and set the objectives. Once the objectives have been established it is necessary to create a strategy that outlines the directions, priorities and institutional responsibilities. From this position it is then possible to formulate the project tactics.

The following guidelines have been adapted from a paper given by Mr. Gai Kula, the Director, Conservation International, Papua, New Guinea, at a conference in Madang, “Mining and the Community” (1998). They are aimed at developing a programme for consulting with the local community and community-based participation:

- The community should decide what type of growth they want and exercise control over their growth and development and be involved in the identification, design, implementation and evaluation of the development.
- Empowerment should be an objective—the community needs to mobilize their own capacities and be social actors rather than passive subjects. In this way they can manage the resources, make decisions and control the activities that affect their lives.
- Local participation in the project cycle involves the community in information gathering. This includes identifying local leaders and existing organizations and establishing what the community sees as key priorities and what ideas, expectations and concerns the people have.
- Creating stakeholders—establishing if individuals or groups can become owners of enterprises.

- Involving the community leaders—who are the traditional owners, who are the political leaders and who knows the most about the forest at the mine site.
- Identifying leaders—different leadership strengths are often associated with different types of people. For example, people who are willing to promote change and take risks are often younger, better educated and have contacts outside of the area.
- Identifying local organizations that could be of use such as religious groups that hold meetings or local economic groups.
- Linking benefits for social improvements—which activities are a direct link between the project objectives and potential local benefits? Who will not receive benefits under the activities planned? What kind of long-term investment will local people make in the activities? Who will control decision-making? Are there ways activities can be structured to provide multiple benefits, such as employment for some, training for others and revenue sharing for the community?
- Distributing benefits. Is it better to have an enterprise run by an individual or by the community with revenue sharing? Is there the local capacity to run the enterprise efficiently? Will some people be stuck in long-term subservient positions? Will competition among individual owners erode group decision-making and strong management? If the benefits are widely distributed will everyone get so little that it is not worth their involvement? Conversely, if the benefits are narrowly distributed will that act as an incentive for others to participate or will it exclude too many people and lead to resentment and income inequality?
- Monitoring and evaluating progress. Developing some key objectives and indicators for the activities initiated can enable projects to measure the impact of their social and economic development activities. This can provide useful input for future planning and can highlight the importance of involving stakeholders, in order to give them a vested interest in, and presumably greater commitment to, the achievement of project goals. It is not always easy to measure achievements against these kinds of objectives, particularly over short periods of time while projects are still in process and before more tangible benefits have become apparent.

In all this is a very lengthy process, which is time-consuming and requires the commitment of large resources, such as funding and human capacity.

Community consultation and participation for a mining project is a critical way of helping to ensure sustainable development. However, gender inequalities in community consultations and local decision-making processes often occur. Furthermore, the perspectives of women and women's organizations may not be adequately identified in scoping exercises. Yet it is essential for the mining industry to gather such information and ensure the participation of women in setting community and environmental priorities and objectives, and the means of implementing them. Facilitating the meaningful participation of women and other marginalized groups can bring significant returns to the sustainability of mining

operations. For example, the World Bank has found that some of the most active community organizations are informal and may be established along gender lines. It is therefore recommended that mining companies actively ensure the participation of women and women's organizations through the project life cycle.

An example of multi-stakeholder participation is the Canadian Whitehorse Mining Initiative, which was based on a shared desire to ensure that mining continues to make an important contribution in the context of sustainable development in Canada. It was the product of consultations between the mining industry, government, unions, aboriginal peoples and the environmental community and is an example of establishing a consensus on how to govern and manage the industry. Appendix 4 provides a reference to the full text of the final report of the Accord.

6. ENVIRONMENTAL MANAGEMENT

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he term “environmental management” incorporates all the activities necessary to ensure that a mining project is designed, operated and closed in an environmentally sound and socially acceptable manner. The principles of good environmental management are:

- identifying all potentially significant adverse environmental impacts and social effects that would result without mitigation or control;
- defining control strategies to mitigate all potentially significant adverse impacts;
- implementing procedures to instigate control strategies in response to the unacceptable risk of adverse environmental impact;
- implementing procedures to review control strategies in response to performance evaluation; and
- implementing procedures to promote the benefits of any positive environmental or social impacts.

In the life cycle of a mining project it is common for the assessment of the social and environmental impacts to be carried out as a reactive study, once an economically viable mineral deposit has been proved and the mine project concept outlined. This is due to the nature of mining projects and their development and can result in the social and environmental issues being seen as an “after-thought”. In addition, the predictions contained in these assessments can alter completely if the original project design criteria, on which they are based, change. Both these issues may appear to detract from the role of the social and environmental impact assessments and minimize their effectiveness in the environmental management of the project.

The socio-economic impacts of a project are often the most complicated and least understood. It is imperative that when a mine closes it does not leave a social or economic void. On the other hand there is always a danger, especially in remote areas, of mining companies becoming surrogate governments. This must not be allowed to happen as it undermines the role of the real government and is liable to leave an even larger void in the region when the company pulls out.

The Government, at both the regional and national level, needs to work closely with the company and the local community to ensure that the socio-economic benefits of the project are sustainable; that they continue to exist long after the mine has closed. This includes such aspects as the stability of the population, quality of life, health, education, basic services and an economy independent of the mine. There are many ways to achieve these goals, but the solutions need to be chosen to suit the country and the region, and not taken from a recipe book. Ingredients have a tendency to vary from place to place.

The physical environmental effects of a project and the potential negative impacts are, by comparison, relatively easy to predict, monitor and remedy. Comprehensive baseline data, collected over a minimum period (usually 1 year), provide the basis for the environmental implications to be taken into consideration in the design of a project. The location of the actual mine is governed by the location of an economically viable deposit but this does not also have to govern the location of the associated infrastructure. No decisions should be made without close consultation with the community and socio-economic considerations, and final mine closure requirements should be part of the deliberations.

There are a number of environmental management instruments that contribute to the ability of the government and mining company to control and mitigate impacts. These include Environmental Impact Assessment (EIA), Socio-Economic Impact Assessment (SEIA), Environmental Management Plan (EMP), Environmental Monitoring Programme, Environmental Audit, Environmental Management System (EMS), Mine Closure Plan and Financial Surety.

The EIA/SEIA process (see Section 6.3 and 6.4) identifies the potential impacts, by the collection of baseline data, and helps the proponent and regulator prevent, minimize, mitigate or compensate for any adverse environmental and social impacts. The EMP (see Section 6.5) then presents the methods and procedures for achieving the desired environmental and social objectives while the Monitoring Programme (see Section 6.6) provides the evidence to prove that the objectives are, or are not, being achieved. An Environmental Audit (see Section 6.7) is an independent and systematic assessment of the overall environmental and social performance of the project and the EMP and Monitoring Programme. The EMS (see Section 4.1) is the instrument used to manage and improve the environmental performance of the company. Finally, the Mine Closure Plan (see Section 6.8) includes the decommissioning and rehabilitation programmes while the Financial Surety (see Section 3.3) provides the funds to pay for rehabilitation.

6.1 Mine Life Cycle

It is essential to closely link the requirements of environmental management with the project timetable and life cycle. The table below presents a standardized model of how the environmental and social aspects fit in to the project life cycle. For an EIA/SEIA to have a legitimate position in the decision-making process, the issues and implications will need to be established during the concept phase. To achieve this it is advisable to specify that the timing of the EIA/SEIA process start as soon as a potentially economically viable deposit has been located.

The EIA/SEIA Process

EIA PROCESS	EIA ACTION	PROJECT CYCLE
Guidelines	Good Housekeeping	Exploration
		Identification
EIA/SEIA Inception	Define Issues/Screening	Concept
Scoping	Baseline Studies	Pre-Feasibility
EIA/SEIA Preparation	Identify/Predict Impacts	Feasibility
EIS/SEIA Approval		Project Approval
EMP/EMS	Monitoring	Construction
EMP/EMS	Monitoring/Auditing	Operation
Closure Plan	Rehabilitation	Decommissioning
		Closure

The EIA/SEIA process, however, does not take into consideration the requirements for community consultation or the environmental impacts during the exploration phase. Although community consultation may not need to take place in any depth at this stage, the district or local government and local population should still be informed about what is going on and, where relevant, asked for permission for access. This can be achieved by public hearings for exploration licences, held on site, and instructions for the exploration geologists to communicate with the local people.

The environmental impacts become relevant once exploration moves from prospecting to larger scale sampling methods, such as benching, trenches and drill cores, with a corresponding increase in personnel. The judicious use of “good housekeeping” regulations and an EMP should be sufficient to provide adequate environmental protection during this phase.

6.2 Exploration

Exploration involves the collection of geological, geophysical and geo-chemical data to determine the mineral potential of an area. It is usually a temporary, minimal impact land-use activity, although it may leave visible traces, especially in dry areas, for many years. A proper commitment to environmental and social responsibility by the proponent should include consideration of the rights of other land-users and protection of the natural and cultural values of the area. New technology has reduced the environmental impact of exploration, enabling large areas of land to be evaluated by remote sensing methods, particularly during reconnaissance.

Good environmental management is an important part of any exploration programme. An EMP should be established where land disturbance occurs. This will normally apply only to advanced exploration, which is defined as meaning: “the excavation of exploratory shafts, adits or declines, the digging of test pits and trenches, and the associated removal of material for bulk testing from an exploration or mining licence area, the installation of a portable pilot plant or other temporary facility for ore and rock testing purposes, or any other significant ground disturbance conducted to determine the existence of a commercially exploitable mineral deposit”. However, even preliminary ground surveys are now expected to respect ecological integrity and pay attention to waste disposal issues. These requirements can be outlined in Good Housekeeping Guidelines.

The issues to consider in the preparation of an EMP for an exploration programme are contained in Appendix 3(a). The contents of an EMP should ensure compliance with environmental conditions on both the exploration licence/permit and any financing requirements. It is sometimes necessary for a financial surety to be established for advanced exploration, as a condition of the licence or permit, to ensure all disturbed land is fully rehabilitated.

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6.3 Environmental Impact Assessment and Statement

The Environmental Impact Assessment is the process by which environmental factors are integrated into project planning and decision-making in a way that is consistent with sustainable development. The EIA helps to protect the environment by looking at the likely environmental effects of a project and by providing the information that allows the developer to minimize these effects during construction, operation and decommissioning. Best practice EIA is the delivery of high quality information from the company to the community, the government and other decision-makers. It requires the developer to describe the proposal in its particular environment, to identify the potential impact on the environment and to describe how the company plans to manage those effects. The EIA can then be used as part of the decision-making process as to whether or not the project should go ahead and, if it does, what conditions should be attached.

The level of EIA depends on the nature of the proposal, its complexity, the local environment, its expected effects and the degree of controversy that the project might create. In best practice EIA the developer begins research early in the life of the project by the collection of baseline data. Community consultation, even during the exploration stage, can highlight potential areas of conflict and establish trust. These can then be developed during the scoping phase of the EIA when all the relevant issues that must be considered are identified. The findings of the EIA are then presented in the Environmental Impact Statement (EIS), the basic elements of which should include:

- introduction to the project;
- description of the site and its environment;
- the policy framework;
- description of the project;
- identification of the issues;
- management of impacts;
- evaluation of alternatives;
- assessment, monitoring and review processes;
- rehabilitation and closure plans; and
- commitments of the company.

The formal EIA/EIS process can be summarized as a logical sequence:

- referral of the project to the regulatory authority;
- government decision on whether an EIA is required;
- scoping of issues and community consultation;
- collection of baseline data;
- preparation of the EIS;
- regulatory authority and public review of the EIS;
- company response to issues raised by regulatory authority and public review;
- revised EIS;
- environmental approval (or refusal) with conditions;
- monitoring and reporting; and
- continuing liaison with community and government agencies.

Not all environmental assessments necessarily take the route of the formal EIA. For example, environmental screening for purposes of financing approval, sometimes undertaken by lending institutions, may take a simpler route, as will projects with a minor environmental impact. Invariably, however, the same evaluation criteria are used, as shown by the requirements of the Norwegian government (see the box below).

Example of evaluation criteria for assessments

Mining projects should be submitted to a more detailed assessment if they fulfil one or more of the criteria set out below, or if insufficient information is available, to answer "no" with a reasonable degree of certainty.

Will the project:

- create substantial pollution problems and a risk of polluting land outside the actual mining area?
- create substantial waste disposal problems?
- create a risk of accidents that may have serious consequences for the local population and the natural environment?
- affect areas that support animal and plant life worthy of conservation or areas with particularly vulnerable ecosystems?
- lead to major changes in the landscape?
- affect areas with historic remains or landscape elements that are of importance to the population?
- change the way of life of the local population in such a way that it leads to a considerably increased pressure on the natural resource base?
- lead to major conflict with regard to existing land use and ownership?
- obstruct, or lead to substantial changes in, the local population's exploitation or use of natural resources other than those directly affected by the project?

Source: *Environmental Aspects of Selected Non-ferrous Metals Ore Mining*, UNEP IE/ILO, 1991.

The EIS is a valuable document to the mine operator and the regulatory authority, as it describes all the environmental aspects and issues of the site. It is a logical starting point in the process of optimizing the environmental performance of the operation. The EIS should be updated regularly as part of the EMS. The EIS should be made available to the local community and any other interested parties. Once the relevant authorities have approved the EIS, the findings and recommendations will then become part of the EMP.

6.4 Socio-Economic Impact Assessment

The Socio-Economic Impact Assessment (SEIA) can be carried out as part of the Environmental Impact Assessment process or can be done as a stand-alone study. The danger of it being done as part of the EIA process is that governments usually require the mining company to establish the terms of reference and carry out the work independently, and do not have an input until the report or statement is in a draft form. This could result in valuable knowledge and understanding of the country and the people not being included. If the SEIA is done as a separate study it could again lose out by not including the physical environmental impacts that may have direct or indirect social consequences. Often the best solution is to establish a steering committee made up of representatives from the national and regional government, the mining company, the community, relevant NGOs and the EIA consultants (if used), to oversee the SEIA.

The socio-economic impacts are the outcome of the interaction between the characteristics of the project and the characteristics of the “host” environment. A consideration of the socio-economic impacts needs to clarify the type, duration, spatial extent and distribution of the impacts. This incorporates: what to include (direct vs. indirect impacts); for which period of time (exploration to closure and beyond); what area to cover (the boundaries of the impact zone); and who will be affected. The content of an SEIA should include:

- the demography and settlement patterns including potential changes due to relocation and migration;
- the land use systems and natural resource utilization, both terrestrial and aquatic, and the possible impacts;
- the cultural and social impacts, including business development, mine related payments, social disruptive influences and law and order;
- the health and nutrition status of the population and adequacy of health facilities and the potential for mine related changes;
- the education facilities and services, employment and income levels of the people in the immediate area of the project;
- the existing other services in the area (including transport, power, water, sewage, waste disposal, police, etc.) and the impact of the project on these services; and
- the influence of the payment of compensation for project-related environmental impacts and social disruption.

It is important to recognize the potential social impacts of mining operations on women and children, and to develop effective mitigation plans, or adjust appropriately. Gender analysis and planning can help identify such impacts. Gender analysis is the systematic examination of the roles, relationships and processes between women and men in all societies, focusing on imbalances in power, wealth, health and workload. Gender typically refers to the socio-cultural construction of roles and relationships between men and women.

It also takes into consideration existing social structures such as race, ethnicity, class and caste. Gender analysis is a useful means of assessing the potential differential impact of proposed mining initiatives and to understand processes for responding with informed and equitable options.

Health and well-being: mining operations can have notable impacts on the health and well-being of women. For instance, mining activities can lead to significant increases in sexually transmitted diseases. In addition, sexual harassment and increased incidences of violence against women in local communities by transient male mine workers is not uncommon. Various forms of abuse of female partners and other family members frequently increase as a result of long-distance commuting of male mine workers. Effective gender analysis seeks to find strategic solutions to mitigate such negative gender impacts.

Impact on women's traditional roles: women are increasingly being recognized as important environmental caretakers. The International Development Research Centre states that: "women are crucial actors in biodiversity management in their multiple roles as farmers, herders, forest gatherers, primary health care givers, market vendors, selectors and preservers of seeds, soil conservationists and keepers of the natural and built environment". Since mining activities, by their very nature, impact the surrounding ecosystem, it is important to identify how mining operations may potentially affect women's multiple roles in biodiversity management.

Gender inequalities in the economic benefits: it is clear that mining can provide significant economic benefits to local communities in terms of direct employment, compensation and in the provision of secondary services. However, women may not necessarily share equally in these economic benefits. Mine operators need to address gender inequalities in the economic benefits of their activities.

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6.5 Environmental Management Plan

The Environmental Management Plan (EMP) is the documentation of the methods and procedures by which the company will achieve the environmental objectives and targets. It also identifies the environmental performance indicators used to measure progress towards achieving those targets and objectives. The EMP should be based on the data and information compiled for the EIA/SEIA. It does not need to be overly detailed but should contain sufficient information for individuals to understand their duties and responsibilities.

The EMP should summarize the targets, objectives and regulations, nominate the individuals responsible and give target dates. Regular updates should record the status of the programme, showing progress on achieving the target or objective, or compliance with the regulations. Updates can also incorporate new targets or responsibilities and amendments to regulations. If an EMP is to be established for an operating mine it should be based on information generated from an environmental audit of the operation.

The EMP should provide for a means of adjusting to changes in government and corporate environmental regulations and requirements. It should also include an audit plan that incorporates a regular mechanism for checking the level of compliance with regulatory conditions and the environmental performance of all components of the operation. These procedures need to be structured to enable identification of areas where environmental improvements can and should take place and incorporate a mechanism for initiating an action plan to effect such improvements. The EMP, its targets and objectives, should also be in conformity with national environmental policies (See Appendix 3[f]).

For further details on establishing an EMP see Appendix 3(g). The factors to consider in the preparation of an EMP for an exploration programme are included in Appendix 3(a). Environmental protection during exploration is covered in detail in Environment Australia's booklet, "Onshore Minerals and Petroleum Exploration", listed in the bibliography in Appendix 10.

6.6 Environmental Monitoring Programme

The aim of the Environmental Monitoring Programme is to assess the environmental and social performance of the project and to demonstrate to the regulatory authority and the community that the operation complies with the objectives established by the EIA/SEIA process. It provides the information required for periodic review and alteration of the EMP, ensuring that environmental and social protection is optimized at all stages of the development. In this way, undesirable impacts will be detected early and remedied effectively. The Monitoring Programme also demonstrates compliance with regulatory requirements.

The key issues for an Environmental Monitoring Programme are to:

- develop improved practices and procedures for environmental and social protection;
- detect short- and long-term trends;
- recognize environmental and social changes and enable analysis of their causes;
- measure impacts;
- check the accuracy of predicted impacts;
- develop improved monitoring systems; and
- provide information on the impact of the mining project.

The schedule for an Environmental Monitoring Programme should be set up so that it is simple to operate and will provide data that can be directly utilized by the company and the regulatory authority. The box below gives the framework for the design of Environmental Monitoring Programmes as outlined in Environment Australia's booklet, "Environmental Monitoring and Performance".

Framework for Design of Environmental Monitoring Programmes

- Identify the scope of monitoring and list the sub-programmes corresponding to each environmental issue of the EMP.
- Define the objectives for each monitoring sub-programme.
- Specify how information collected will be used in the decision-making process.
- Define the spatial and pathway boundaries for the work and select, map or plan scales and sites for observation, measurement or sampling.
- Based on appropriate characterization studies, select the key indicators for direct measurement, observation or sampling.
- Define how the data will be analyzed and interpreted and how it will be presented in the monitoring report.
- Define required precision and accuracy in the data.
- Consider compatibility of the data to be collected with historical data and with contemporary related data.
- Set minimum requirements for monitoring air, water, discharges, biological systems, etc.

Source: Environment Australia, "Environmental Monitoring and Performance".

Appendix 3(g) contains a general guideline for an Environmental Monitoring Programme that focuses on the physical aspects of monitoring.

The results of the Environmental Monitoring Programme are usually reported to the regulating authority on a weekly, monthly, quarterly or annual basis, depending on the environmental permit conditions. The authorities are increasingly relying on regular reporting of monitoring results, including any non-compliance or unusual incidents, rather than frequent inspection by their own staff. Where monitoring indicates that environmental parameters are exceeding statutory levels, for example contaminant or sedimentation levels in the natural aquatic environment, a planned response should be determined and set in place to effectively control any adverse effects. Each monitored parameter should be linked to a contingency plan to enable corrective measures to be taken and the department or position responsible for the measures should be identified.

6.7 Environmental Audit

In the context of the environmental management of a project, an Environmental Audit assesses the environmental and/or social performance of an existing operation. It is a method of ensuring compliance with regulatory requirements and of guaranteeing that the performance complies with stated policies and objectives. An Environmental Audit can be carried out for an existing project whether or not it has an EIA/SEIA. Many of the tasks performed for an Environmental Audit are equivalent to those of an EIA/SEIA and so the scope is similar.

A succinct definition of an Environmental Audit is given in the box below.

What is Environmental Auditing?

Management tool: the audit is not an end in itself, but serves to facilitate management control of environmental practices.

Systematic assessment: auditing involves a structured approach following an established protocol.

Periodic: audits are conducted periodically in relation to the overall review process.

Documentation: an audit results in a written report.

Environmental risk: audits highlight environmental risk faced by a company, and should recommend action to minimize risk.

Compliance: some compliance assessment is part of every audit, although the degree to which strict legal compliance is assessed is determined by the audit objectives.

Objectivity: while there is some acceptance of self-auditing for internal review, there is a distinction between such self-assessment and verified independent auditing. Auditors are generally independent of the organization being audited.

Source: Environment Australia, "Environmental Monitoring and Performance".

Environmental Audits are conducted on the basis of pre-designed, site-specific audit protocols that can take the form of checklists, questionnaires, written guidelines, rating systems and specific questions. A typical Environmental Audit for a mining operation would include the consideration of site conditions, regulatory compliance, potential liabilities, environmental management structure and environmental reporting procedures. The table of contents of the EMP provides a handy and logical checklist for audit purposes.

In addition to general environmental management audits, there are a number of other audits that may be undertaken, although the distinction between each type is relatively arbitrary and there is considerable overlap.

Environmental Management System Audit: for those companies with a formal EMS in place. This audit reviews both the technical and organization aspects of the EMS.

Compliance Audit: to demonstrate compliance, or otherwise, with environmental legislation, regulation, licences, approvals and other documentation, including the corporate environmental policy, and commitment to industry codes, charters and principles that the company has signed.

Technical Process Audit: to determine whether a particular process or operation is having a detrimental effect on the environment. These audits may focus on energy, waste, pollution or site conditions.

Environmental Liability Audit: may be requested by potential purchasers or by financial institutions when considering investment or acquisition.

6.8 Mine Closure Plan

Mine closure can have a negative impact on both the physical environment and the socio-economic structure of the region. An important aspect of mine planning is the rehabilitation of disturbed lands to a stable and productive post-mining land form, which is suitable and/or acceptable to the community. Of equal or greater importance is the socio-economic rehabilitation of the community, thereby ensuring that the benefits of the project are sustainable. The physical and social rehabilitation programmes should be an integral part of the life cycle of the mine.

Before starting any physical mine site rehabilitation, closure objectives and a detailed plan of action need to be established. The essential goal of site rehabilitation is to return all affected areas, as near as possible, to their optimum economic value. This does not always involve returning a site to its original state or use. The main aims of site rehabilitation are to reduce the risk of pollution, to restore the land and landscape, to improve the aesthetics of the area, to prevent further degradation and to provide for future economic use. Through consultation with relevant interest groups, including the regulatory authority, traditional owners and private owners, the mine operator can establish the required future land use for the different physical components of the project.

Mine closure and rehabilitation can be divided into three main stages, though the boundaries between these stages are often difficult to distinguish and in some cases “active care” may need to continue for several decades, or even in perpetuity. The three stages are:

- **The Planning Stage:** a rehabilitation plan should be established and integrated into the mine plan and environmental management plan or system at the earliest possible opportunity and regularly updated during the operating life of the project.
- **The Active Care Stage:** the active care programme immediately follows the cessation of activity in a specific area, i.e.: the closure of a waste rock dump, or the total cessation of mining.
- **The Passive Care Programme:** the passive care programme is a period of sampling and monitoring designed to demonstrate that the active care programme has been successful and that a “walk-away” state has been achieved.

In many countries local communities, and to a lesser extent governments, will have little information about the development of a mining project. The introduction of a cash economy, contributed to by employment, compensation, royalties and spin-off businesses, can upset the local balance, and ultimately the culture, of the region. Often the mine is the only source of direct employment in the area and also supports the local economy and indirect employment. The closure of a mining project, if not carefully planned, is likely to have a severe negative impact on the socio-economic status of the community by the sudden removal of this major financial provider with nothing to take its place.

The socio-economic aspects of closing a mine should take into consideration the workforce, the community that has become established because of the mine and the local community who were in the area before the advent of the mine. To try to lessen the blow the mining company needs to work with the local community and government to establish strategies for supporting these communities from the conception of the project. Consultation should be aimed at establishing a development plan for the region that takes into account the continuation of essential services such as medical care, schools, etc., and the identification of self-sufficient industry, which need to survive after the mining company has left.

The tables contained in Appendix 3(h) outline the issues, objectives and methods of control that need to be considered for mine closure.

7. SMALL-SCALE AND ARTISANAL MINING

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here is neither a widely accepted definition of small-scale mining nor any hard and fast rules for differentiating between small-scale and artisanal mining. In many countries the two are grouped together under one or other title, while other countries identify them according to their legal position. Whatever the definition, the characteristics of both activities are often very similar and include:

- low-level or no mechanization;
- labour intensive;
- low safety standards;
- poorly trained workforce;
- lack of technical expertise;
- poor utilization of the resource;
- seasonal activity;
- high level of environmental impact; and
- high level of social disruption.

To avoid confusion, the use of the term “small-scale mining” in these Guidelines will include the poorly regulated and non-regulated sector of the mining industry.

The regulation of small-scale mining is a complex problem and requires a coordinated approach since it encompasses economic, social and cultural issues, as well as environmental concerns. It has caused widespread environmental damage in many countries and is often associated with serious health problems for the miners and associated community. Small-scale mining often provides economic improvement for people who usually live in a subsistence economy. Any solutions must take into account the health and environmental impacts of poverty, the needs of small-scale miners and their extended families, the ability of the regulating authority to monitor and enforce legislation and the requirements of the large mining companies that often compete with small-scale miners for minerals and access to land. The special needs of women, who often represent up to 50 per cent of the small-scale mining workforce, and child labour should also be taken into consideration.

Environmental problems caused by small-scale mining include mercury pollution, heavy metal contamination, deforestation, erosion of fertile soils, degradation of river banks, digging of holes and trenches that endanger wildlife, etc. Major health risks to small-scale miners include: exposure to dust, exposure to mercury and other chemicals, effects of noise, effects of poor ventilation and physical injury due to inadequate working spaces and inappropriate equipment. The associated community health is also at risk from poor sanitation facilities, lack of clean water, malaria, cholera, typhoid, dysentery, tuberculosis, bilharzias, sexually transmitted diseases (including AIDS), malnutrition and substance abuse.

In order to regulate small-scale mining effectively authorities need to fulfil both a regulatory and a training and assistance role. In a recent report on the “Design and Pilot Implementation of a Model Scheme of Assistance to Small-Scale Miners” produced by Wardell Armstrong (Department for International Development, United Kingdom, KAR Project No. R7181) the authors identified a number of model policies and possible actions to assist in the development of a sustainable and productive small-scale mining sector. These are:

- Establish two separate bodies to oversee the small-scale mining sector: a regulatory unit and a technical services unit.
- Provide both bodies with adequate budgets and qualified personnel to ensure effective regulation and monitoring of activities of the sector.
- Provide legislation and guidance for the small-scale mining sector that is concise, transparent and relevant.
- Legalize small-scale mining operations, set basic standards, encourage adoption of “best practice” and make clear the obligations of all stakeholders.
- Implement a system of best practice for environmental and health and safety protection.
- Minimize the use of harmful substances and unsafe practices by small-scale miners.
- Minimize the environmental degradation caused by small-scale miners.
- Mitigate the historical degradation caused by small-scale mining activities.
- Maximize the effective, efficient and environmentally responsible exploitation of the mineral resources of the country to the benefit of all.
- Provide a mineral exploitation framework within which all types of mining enterprises are catered for and their interests protected.
- Declare the percentage of the country's mineral output that shall be sourced from small-scale mining.
- Provide technical assistance and training schemes that are long-term and sustainable and aim to be self-financing.
- Establish sub-national training centres based around mining areas.

- Implement a non-discriminatory approach to all small-scale miners regardless of gender, educational capacities, physical conditions, etc.
- Encourage mainstream mining industry to aid in training programmes.
- Provide long-term and sustainable credit schemes that ensure good repayment results based on firm business terms.
- Ensure that miners get a fair price for the commodities that they produce and eliminate or minimize illegal (black market) trading activities.
- Encourage as much downstream processing of commodities as possible within the country.

References to these model policies and possible actions can be found in Appendix 3(i).

In most countries the small-scale mining sector requires radical reform if it is to be turned into an industry that provides a net benefit to all concerned. However, any reform should focus on the alleviation of poverty by providing financial betterment and empowerment to small-scale miners. Such obvious and visible improvements will then act as a catalyst to other miners who will also wish to improve their financial position. Small-scale miners must also act within some sort of regulatory framework and with due respect for their health and safety and the preservation of the environment. The Wardell Armstrong report identifies the issues that are fundamental to improving the general management, efficiency, safety and environmental performance of the small-scale mining sector in developing countries as:

- defining a model government institution, unit or department to administer and manage the small-scale mining sector;
- establishing an “enabling” mechanism within an appropriate legislative framework and licencing scheme;
- defining relevant and consistent health and safety standards and practices;
- establishing appropriate and realistic environmental protection;
- delineating or defining potential mineral bearing areas suitable for small-scale mining exploitation;
- establishing self-sustaining technical assistance and training schemes;
- providing a viable and efficient financing scheme;
- providing a simple and effective system for purchasing mine produce at fair and equitable rates.

Governments also have a central role to play in the transfer of new technology and training of small-scale miners in acceptable environmental management practices.

8.1 Information Access Rights

The current attitude regarding the right of the public to be involved in the decision-making and development of a project has evolved over many years. Public consultation and information disclosure is becoming more common as a legal requirement and is often a condition of an investment or loan.

The International Finance Corporation (IFC), a member of the World Bank Group, has outlined four management principles for disclosing project information in its Good Practice Manual, "Doing Better Business Through Effective Public Consultation and Disclosure". They are:

- **Disclose early:** To the extent possible, be open about the project. Aim to provide information to the public as early as possible during the planning and implementation of a project, except in cases where such disclosure would materially harm the interests of the company.
- **Use information disclosure to support consultation:** Treat the disclosure of project and environmental and social information as an integral part of effective public consultation. In particular, provide information about the benefits and disadvantages of the project early enough to allow people time to think about the issues and weigh the trade-offs. Remember to be open about potential adverse impacts and associated mitigation measures that may be involved in the project, including possible benefits and positive impacts that may raise expectations.
- **Provide meaningful information:** Provide information in a form that is readily understandable and meaningful to project-affected people. The objective should always be to enable people to make informed judgements about changes that will affect their lives. Points to consider in determining what form this information should take include: local languages and dialects, clarity, cultural sensitivity, gender, age, ethnicity, literacy levels of the population and local methods of disseminating information within and among communities.
- **Ensure the accessibility of information:** Disclosing information solely by depositing project documentation in locations open to the public, such as government offices, is not a totally effective method of reaching the population who will benefit from reading the material. It is more useful and constructive to disseminate information to project-affected people in culturally appropriate ways such as in individual, small group, or public meetings, and through the local media or direct mail. Information should be provided early enough in the process to allow stakeholders time to understand and discuss what they have read or been told and to prepare their points of view.

These show how access to information could be enacted as a legal right of citizens and affected communities.

8.2 Emergency Provisions

Recent accidents involving tailings dams and cyanide spills have highlighted the need for a company to have an emergency response programme and for the government and the public to be fully aware of, and understand, the programme. Emergency/contingency planning should cover all environmental hazards and should be integrated into the risk assessment and management (see Section 4.4). Planning needs to be based on rigorous hazard identification and testing of response capability. This analysis should then be used to establish site emergency plans. Emergency planning should include provisions for incident reporting, including near-miss incident reporting, and timely and rigorous incident investigation.

Emergency response planning should include the relevant regulatory authorities and the potentially affected community. Public anxiety about the impact of an accident is greatly reduced if an understanding about the possible consequences has been established. Such understanding is impossible to achieve after an incident because high anxiety levels and a low level of trust diminish learning ability. It is also essential that the government and the local population understand what their role is and what they must do in the case of an accident.

UNEP's APELL (Awareness and Preparedness for Emergencies at Local Level) Programme has been designed to help companies, local governments and the emergency services put together a coordinated plan to improve public preparedness in case of industrial accidents, including those that may arise at mine sites. The APELL Programme is not a unilateral plan on the part of the company or of the emergency services, but involves all the affected partners and actors. An outline of the APELL process is given in Appendix 9.

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8.3 Health and Safety

There is general and genuine confusion as to whether health and safety issues in the working environment should be included in the environmental legislation and documentation. Most countries with a mining past have separate legislation that covers technical safety regulations and health protection for workers in mining operations, which comes under the auspices of the relevant mining ministry. However, the late appearance of "the environment" on the mining scene meant that some mining companies attached it to the health and safety department, rather than creating a separate new department. This has led to some confusion over the implementation of the relevant legislation and for this reason, it is often better to keep the two separate, though there are obvious areas of overlap.