

VIII. AN INTERNATIONAL OVERVIEW OF LEGAL FRAMEWORKS FOR MINE CLOSURE

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A. INTRODUCTION

Since the inception of mining approximately 3,000 years ago, mining activities have left their mark on the landscape—normally as the ancient areas of excavation or sites of metal working. Although ancient scars remain, it is the activities associated with mining activities since the industrial revolution that have left the largest scars. Prior to the industrial revolution most mining was for high-grade materials and therefore required comparatively modest excavation. With the industrial revolution came large scale, often open pit, mining for coal, iron, manganese, copper and to a lesser extent for lead, zinc, gold and nickel. Such mining not only removed enormous tonnage of ore but of waste rock and tailing as well—all of which requires reclamation upon mine closure if an area is to be used again. Regrettably such reclamation on closure was not the case and today the developed nations, as well as the developing and emerging economies, are faced with decades, if not centuries, of mines and mining debris to clean up. As will be discussed later, the issue of mine closure is not restricted to just the physical waste but to all the ancillary impacts derived from the waste and the mining activity overall. It is these impacts, from past mining and present activities, which must be mitigated and controlled through effective government action and sound policies for mine closure.

The concepts, definitions and issues surrounding mine closure are rapidly and range from “... the rehabilitation of disturbed lands to a safe, stable and productive post-mining landform, which is suitable and/or acceptable to the community...” (Allen and Briggs, 1999), as “... site rehabilitation and restoration to ensure that the closure of a mine will not compromise environmental quality in the future and will limit the extent of any prospective liabilities for both the operator, the government and the community” (Sasson, 1996) and as “... returning mine sites and affected areas to viable and, wherever practicable, self-sustaining ecosystems that are compatible with a healthy environment and with human activity (Mining Association of Canada, 1994). The common theme in all of the above definition is that of the reclamation and rehabilitation of the area impacted by mining to a state that precludes further environmental damage and allows for alternative use. In essence, mine closure is largely regarded by industry and, until recently by most governments, as primarily an environmental issue.

From the perspective of governments, mine closure presents a complex mixture of environmental, social, economic and development issues that the government must have ensured that (a) industry has adequately recognized and prepared for over the life of the mining enterprise and (b) that the closure plan is carried out to the satisfaction of the communities involved, other major stakeholders and government at all levels. Governments are now coming to realize that they have the most direct responsibility for defining and ensuring comprehensive mine closure within the broader context of the issues of “social/economic equality” and “sustainable development”. This recognition of a broader context of mine closure has greatly expanded the scope of government responsibilities and needed actions.

Mine closures have, are having, and will continue to have a major impact across the broad spectrum of concerns of all of the groups that are directly and indirectly impacted by the closure. The accommodation of all of these concerns, to the extent possible, results in what the authors term as

“comprehensive mine closure”. It is the purpose of the remainder of this paper to address the key components, particularly of policy, legislation, and regulations, of government action that are required to ensure responsible mine closure and sustainable development following closure.

B. THE DIVERSE NATURE OF MINE CLOSURE ISSUES

The issue of the types of mine closure is itself diverse and it is necessary to recognize that mine closure takes many forms. The most obvious types of mine closures, and those most discussed, are abandonment and terminal closure; the latter occurring when an ore body is mined out and a company, following reclamation and rehabilitation, permanently ceases operations. In reality, however, it is common that many mines are “temporarily” closed because of political, economic, market, technical, environmental or social reasons with the intention (not usually realized) that they will be reopened at a later date. Many such temporary closures result ultimately in such properties becoming abandoned mines. Also common, particularly in the transitional economies (Clark and others, 1998), is that mine closure, resulting from rehabilitation, rationalization and/or privatization, often results in some form of partial closure, i.e. restricted to specific workings within or adjacent to a major mine, by which some level of mining continues in the rest of the mine or area. Each of these types of mine closure presents their own special problems for both government and industry.

Perhaps no area of government/industry responsibility in mine closure is expanding more rapidly than that of assuring the sustainable development of mining areas overall and in particular once mining ceases. Broadly viewed, the evolution of issues associated with mine closure have been characterized by a general lack of concern in most nations for comprehensive mine closure prior to the 1960s; followed by an increasing concern for environmental issues related to mine closure (acid mine drainage, reclamation and rehabilitation) in the 1970s and 1980s to the consideration of the broader spectrum of sustainable economic, environmental and social development issues related to comprehensive mine closure in the 1990s and that continues into the new millennium.

The most striking of these changes has been the need to meet, within the framework of “cradle to the grave” mineral development, the needs and concerns of a constantly increasing number of stakeholders (Clark and Clark, 1999) in the closure and post-closure process. The need to more fully address the social dimension of mine closure is a relatively new concern in the majority of nations and throughout the industry – albeit a few examples of successful mine rehabilitation, reclamation and closure have been accomplished in Canada and to a very limited extent in Australia, England, Wales and the United States. Central to the incorporation of the social dimension into mine closure is the need to integrate Social Impact Assessments into mine planning and to incorporate a Social Mining Plan as a part of the overall development (Clark, J., 1994).

C. GOVERNMENT’S ROLE IN MINE CLOSURE

In most countries, the role of government in comprehensive mine closure is expanding rather than contracting largely because government’s role remains primarily that of enacting and implementing appropriate policy and legislation.

At the broadest levels government mine closure policy may be in part dictated by its own national constitution that mandates a healthy environment for its citizens or by requirements of international treaties and agreements (United Nations Convention on the Law of the Sea, Basel Convention). At the national level individual national sectoral policies and legislation (other than those for environment and mining), various Executive Decrees and specific Local Government Agreements (often with industry) all must be provided for as part of an overall national programme for acceptable mine closure. These are in addition to specific instruments under Environmental and Mining legislation that require putting in place policy and

legislation for Environmental Impact Assessments, Social Impact Assessments, Mining Plans, Standard Mining Agreements, bonding procedures and providing for Inter-Ministerial Agreements to achieve comprehensive mine closure and sustainable development.

The scope and complexity of the considerations that governments must accommodate in developing a comprehensive mine closure policy and process largely accounts for the fact that (a) that many countries do not have provisions for mine closure in their mining laws, (b) that mine closure in most countries is primarily with respect to reclamation and rehabilitation and (c) few governments have actual mine closure legislation. An international overview of the provisions for mine closure, and their scope, is presented in the following section.

D. GOVERNMENT MINE CLOSURE POLICY AND LEGISLATION: A GLOBAL PERSPECTIVE

Under the best of circumstances, comprehensive mine closure and all that it entails would simply be part of any mining enterprises, however, past history and present practices in many countries clearly demonstrates that this is not the case. Therefore, the majority of countries within which mining is a major (sometimes only a minor) activity have put in place policies and legislation that provide directly (within the national Mining Law) or indirectly (normally within the national Environmental Law but also within many Foreign Investment Laws) for comprehensive mine closure. Compliance with these provisions is often a pre-condition of acquiring a mining licence rather than a matter of “best practices” which would be a far better approach, e.g. as in Chile for recent developments by transnational corporations. In still fewer countries, their legislation contains only general statements with respect to “appropriate” or “reasonable” reclamation and rehabilitation with the specific issues related to mine closure normally being dealt with on an “ad hoc” basis.

Nevertheless, in most countries, comprehensive mine closure, as detailed in an overall *Feasibility Study, a Plan of Operations (Mining Plan), an Environmental Impact Assessment or an Environmental Mining Plan* are normally preconditions for acquiring a mining licence and de facto the most common means of ensuring comprehensive mine closure by the government. Regardless of the approach or the requirements, however, rehabilitation, reclamation and mine closure plans vary greatly among and within individual countries, as do the requirements for bonding or other surety instruments to ensure that the plans are carried out.

Overall, only a very few countries and/or their individual provinces/states, have enacted and implemented actual mine closure laws e.g. the United Kingdom, the Province of Ontario and the state of Nevada, United States of America. In most countries, mine closure requirements occur either within the mining law, and/or its associated Implementing Rules and Regulations (IRRs) for the mining laws, or within specific environmental legislation that is applicable to the mining sector. In the latter case, the requirement is that an EIA or EIS be prepared for development projects that are anticipated to have a large environmental impact.

In the following sections, a brief overview of the policies, legislation and requirements pertaining to mine closure in a number of countries are summarized. The discussion is divided on the basis of two groupings of countries, i.e. Australia, Canada, Europe, Japan and the United States (Group A – Table 8.1) and a second grouping (Group B – Table 8.2) of largely developing countries that have been geographically divided into countries of Africa, Asia, Latin and South America, Pacific Island countries and South-East Asia for purposes of the present discussion. In both cases, this arbitrary division is primarily for ease of discussion, because of commonalities of policy and legislation, although, there are significant differences within countries of each group. Selected overview of international legislation pertaining to mine rehabilitation, reclamation and mine closure is contained in Appendix 1.

1. Mine Closure Policy and Legislation of Group A

The mining history of the individual countries of Group A are quite similar, except with respect to the much longer history of mining in Europe compared to that in other countries, in that mining has been (a) extensive throughout each country, (b) diverse in terms of mineral commodities mined, (c) a mixture of small-to-large scale underground and surface mines and (d) that all countries have a large numbers of abandoned mines (factors that are also true for many of the countries of Group B to be discussed later). In general, however, in the countries of Group A, the scope and nature of resulting mine closure issues have been quite similar as have been their responses, at the national and subordinate (province, state, territory) levels of government. The most striking similarities include the following.

All countries have developed broad national policies and legislation that impact directly or indirectly on mine closure, e.g. in the United States, the national government has legislated the National Environmental Policy Act (1969), the Clean Air Act (1970), the Clean Water Act (1972) and the Resource Conservation and Recovery Act (1976), all of which generally apply to issues related to mine closure. Similarly, in the United Kingdom, the Department of the Environment has issued Mineral Policy Guidance Note 7 entitled “The Reclamation of Mineral Workings” as guidance to all local planning authorities for overall planning for mine closure (Department of the Environment, 1996).

Although mineral resources are considered the property of the State, the responsibility for the enactment, implementation, monitoring and for ensuring compliance of specific mine closure policy and legislation is largely, if not exclusively, the responsibility of the subordinate levels of government.

For all of the countries, the issues surrounding the closure of abandoned and operating coal mines is a paramount consideration, primarily because of the environmental impact of Acid Mine Drainage (AMD), and levies are placed (normally at the subordinate level of government) on present coal production to provide funding for the clean-up of abandoned coal mines. The issue of AMD is equally important for many base metal mines, however, no country, as yet, has specifically dealt with this issue.

Another common feature of policy and legislation relating to mine closure is that the Environmental Impact Assessment requirements require consideration of the social impacts of the mine as well as those on the environment. Further, existing policy and legislation and/or executive decrees require that these social impacts be considered during mining, closure and post-mining periods. In virtually all cases, policy and legislation requires that local and indigenous people be included in all development planning, in approval processes and throughout the life of the mine.

Although there are many similarities at the national and subordinate levels of government of the countries in Group A, there are also many differences in how they deal with the specific aspects of mine closure. The greatest differences are with respect to the level of specific policy and legislation that is in place for the abandonment and post-closure responsibilities of existing and planned mines (table 8.1). For these areas of concern, the subordinate levels of government in Australia and Europe have each evolved fairly consistent and comprehensive policies and legislation, whereas, in Canada and the United States, there is considerable variation among and between the subordinate levels of government.

The trend in all of the countries in Group A is most certainly toward developing a more comprehensive approach, at all levels of government, to ensure acceptable mine closure. Industry itself is also taking a more active role in defining acceptable guidelines for mine closure. The most recent and comprehensive example of this is the issuance of the “Mine Closure Strategic Framework” working paper prepared by the Australian and New Zealand Minerals and Energy Council.

Table 8.1. Legislative provisions for mine closure in the provinces/territories of Australia and Canada, Europe and individual States of the United States of America

Country, State or Province	Specific Provisions for Reclamation	EIA Required before Lease	Bonding Procedure	Provisions for Abandonment	Provision for Non-Compliance
Asia					
Japan	x	x	x	x	x
Australia					
New South Wales	x	x	x	–	x
Northern Territory	x	x	x	–	x
Queensland	x	x	x	x	x
South Australia	x	x	x	x	x
Victoria	x	x	x	x	x
Western Australia	x	x	x	x	x
Canada					
British Columbia	x	x	x	x	x
Manitoba	x	–	x	–	x
New Brunswick	x	x	x	–	–
Northwest Territories	x	x	x	–	x
Nova Scotia	x	x	x	x	x
Ontario	x	x	x	x	x
Quebec	x	x	–	–	–
Saskatchewan	x	x	–	–	–
Yukon Territory	x	x	x	–	x
Europe					
Germany	x	x	x	–	x
Ireland	x	x	x	x	x
United Kingdom	x	x	x	x	x
Wales	x	x	x	x	x
United States					
Alaska	x	x	x	–	x
Arizona	x	x	–	–	x
California	x	x	–	x	x
Montana	x	x	x	–	x
Nevada	x	x	x	–	–
New Mexico	x	x	–	–	x
Utah	x	x	–	x	x
Washington	x	x	–	–	x
Wyoming	x	x	–	x	x

Sources: Fortin, 1992; Gallaher, and Lynn, 1989 and Intarapravich and Clark, 1994.

Table 8.2. Mine closure provisions in the mining laws and associated implementing rules and regulations of Group B countries

Country	Closure Negotiated ¹	Require EIA ²	Require SIA	Require Rec/Rehab	Require Bonding
Africa					
Burkina Faso	–	x	x	x	x
Botswana	x	x	–	x	–
Côte d'Ivoire	–	x	–	x	x
Ghana	–	x	–	x	–
Mali	–	x	–	x	x
Namibia	–	x	–	x	–
Tanzania	x	x	–	x	–
Zambia	–	x	–	x	x
Zimbabwe	–	–	–	–	–
Asia					
Bhutan	–	x	x	x	–
Brunei Darussalam	–	–	–	x	–
Cambodia	–	x	–	x	x
China	x	–	–	x	–
Democratic People's Republic of Korea	–	–	–	x	–
Indonesia	x	x	–	x	–
India	x	–	–	x	–
Kazakhstan	–	x	–	x	–
Kyrgyzstan	x	x	–	x	–
Lao People's Democratic Republic	–	x	x	x	x
Malaysia	x	x	–	x	–
Mongolia	–	x	–	x	x
Myanmar	–	–	–	–	–
Philippines	–	x	x	x	x
Republic of Korea	–	–	–	–	–
Sri Lanka	x	x	–	x	–
Tajikistan	–	–	–	–	–
Thailand	x	x	–	–	–
Uzbekistan	x	–	–	x	–
Viet Nam	–	x	–	x	x
Latin/South America					
Chile	–	–	–	–	–
Costa Rica	x	x	–	x	–
Ecuador	–	x	–	–	–
Guyana	x	–	–	–	x
Mexico	x	x	–	x	–
Peru	–	x	x	x	–
Venezuela	x	x	–	–	–
Middle East					
Islamic Republic of Iran	x	x	–	x	–
Saudi Arabia	x	–	–	x	–
Pacific Islands					
Fiji	–	x	x	x	x
Papua New Guinea	x	x	–	–	–
Solomon Islands	–	–	–	x	x
Vanuatu	x	x	–	x	x

Notes: ¹ Virtually all Mining Laws provide for a great deal of discretion on the part of the Minister would apply to issues of mine closure. Those noted (x) pertain to delegations of authority that are specific with respect to mine closure.

² Does not take into account provisions that may exist in other legislation (in particular environmental legislation) that may address mine closure issues either directly or indirectly.

2. Mine Closure Policy and Legislation of Group B

The level of provision for mine closure within the mining laws and regulations of the countries of Group B is largely dependent on three factors i.e. (i) the age of the country's mining law and regulations; (ii) the activities of past mining enterprises; and (iii) related policy and legislation, in particular environmental policy and legislation.

In general, it can be seen from table 8.2 that for those countries whose mining policies and laws have not been rewritten or revised since 1985, and in some instance even more recent legislation, have few if any specific provisions pertaining to the environment generally or for mine closure specifically. Particularly striking in this regard is the 1983 Mining Law of Chile, one of the world's largest mineral producing countries, that is perhaps the only Mining Law that does not contain the word environment nor has any provisions for reclamation, rehabilitation or mine closure. Chile has, however, recently moved to deal with these issues under its environmental policy and legislation. In the majority of the older mining laws, issues pertaining to mine closure are dealt with in only the most general terms. It is equally important to recognize that although the policy, mining laws and regulations in many of the countries of Group B have recently been rewritten or significantly updated, those in many countries, particularly in the Central Asian Republics and Latin and South America and to a lesser extent in Africa, are incomplete with respect to dealing with issues surrounding mine closure (table 8.2).

As a general rule, those countries with an extensive mining history, characterized by a large number of abandoned mines and resulting environmental problems and those which have recently rewritten their mining laws and regulations, e.g. Bolivia, China, Namibia, Viet Nam, and Zambia (table 8.2) tend to have developed more comprehensive and detailed policies and legislation for mine closure. In large part, this has been the result of (a) pressures exerted largely by local governments and communities acting in conjunction with components of both national and international civil society, (b) by transnational mining companies desiring a well-defined mining environment, and (c) the input of assistance organizations, (Asian Development Bank, World Bank, the United Nations Development Programme, bilateral assistance projects).

For many countries in Group B, the major determinant in ensuring more acceptable mine closure practices has been the rapidly increasing and diversifying role, and importance of governmental environmental agencies (normally the equivalent of a Department of Environment) and subordinate levels of government. In particular, the common requirement is that the approval for all development projects, and in particular those related to mining, be conditional on an approved Environmental Impact Assessment as a part of an overall Mine Development Plan has necessitated that similar conditions be included not only in mining policy and legislation but also in Foreign Investment Laws (Lao People's Democratic Republic, Viet Nam).

It should be noted that although the concern for comprehensive mine closure often derives from environmental agencies and their activities, their efforts are not, in many countries, the primary "driver" for comprehensive mine closure. Rather, it is a priority concern of the mining agencies as well. Again, in the case of Chile, the Environmental Unit of the Ministry of Mines has taken a leading role in carrying out studies to develop the above-mentioned new Chilean legislation for mine closure.

Finally, it should be noted that in many of the countries in Group B, mine closure issues may not be addressed within existing mineral policy and legislation, however, it may be covered within the various types of mining agreements. As an example, the Mining Law of Indonesia was passed in 1967 and, as can be seen from table 8.2, has only very few articles that pertain to the environment and mine closure. However, within the Indonesian Contract of Work (COW), under which mining is conducted, there are specific requirements for an Environmental Impact Assessment and plans for mitigation that include issues of reclamation, rehabilitation and mine closure. Conversely, in Papua New Guinea, the relatively recent Mining Law of 1992 does not have specific provisions for either an Environmental Impact Assessment or

for a Mine Closure Plan (table 8.2). Nevertheless, recent mining developments do fall under the Environmental Planning Act of 1978 and its subsequent amendments and, therefore, environmental impact assessments and an environmental work plan (containing provisions for mine closure) are required for new developments.

Ironically, two of the largest mines in the Papua New Guinea, the Bougainville Mine (now closed) and the OK Tedi Mine (presently planning for closure), that have had major environmental problems and for which provisions for mine closure remain problematic, remain excluded from compliance with the Environmental Planning Act (as they pre-date the Act). Instead, each mine operates under a separate contractual agreement within which environmental and mine closure provisions were/are largely negotiable. Such negotiable provisions for mine closure, on a case-by-case basis, is characteristic for many of the countries of Group B, e.g. Botswana, Guyana, India, Kyrgyzstan, Vanuatu and many others.

a) Varying Approaches to Mine Closure in Group B: As would be expected, the mine closure policies of the individual countries of Group B vary considerably in scope and detail, however, among the more common features are the following:

Many of the countries of South America (Brazil, Chile, Peru, Argentina), the former Union of Soviet Socialist Republics (in particular the Russian Federation, Kazakhstan, Kyrgyzstan, and Uzbekistan) and of Asia (Indonesia, China, Myanmar) that had (still have) large state-run mining operations, are characterized by (i) having only very general policy and legislation for mine closure, (ii) mine closure issues being normally negotiated and incorporated into individual mining agreements, (iii) the retention of a high degree of state responsibility for the closure of present and past state mining operations, (iv) limited contingent liability for foreign investors with respect to mine closure issues arising from past operations, and (v) few, if any, bonding procedures to ensure comprehensive mine closure (table 8.2).

Similarly, in the countries of Africa (Republic of South Africa, Tanzania), Latin and South America (Mexico, Ecuador), Asia (Papua New Guinea, Thailand), each with a long mining history of private sector mineral development, are characterized by (i) having only very general policy and legislation for mine closure, (ii) providing for mine closure on a negotiated “mine-by-mine” basis, (iii) a high degree of state responsibility for both abandoned and some operational mines, and (iv) few, if any, bonding procedures to ensure comprehensive mine closure.

Within the countries of Group B, only Bhutan, Bolivia, Burkina Faso, the Lao People’s Democratic Republic, Mali, Mongolia, Namibia, Peru, the Philippines, Viet Nam and Zambia can be said to have comprehensive policy and legislation that provides for comprehensive mine closure and for post-mining sustainable development. With the exceptions of Bolivia, Namibia, the Philippines and Zambia, that would have to be considered major mineral-producing countries, all of the remaining countries have relatively small mining sectors. What is important in such an observation is that many of the world’s largest mining countries, excluding those in Group A, have inadequate policies and legislation for comprehensive mine closure and still fewer provide for post-mining sustainable development. Yet, it is in these countries that post-closure sustainable development presents the greatest problems for government.

A key element in achieving comprehensive mine closure is that of requiring bonds to be posted to ensure that there will be adequate financial resources available to the mine, or the government, on closure to ensure that it can be carried out successfully. Bonding is particularly important in the countries of Group B where, quite often, other forms of ensuring compliance are weak or non-existent. Table 8.2 shows that approximately 30 per cent of the countries studied have provisions for bonding and of this group only the Philippines and Zambia can be considered as major metal producing countries. It is particularly noteworthy that none of the major mining countries of Central Asia or Latin and South America presently have bonding provisions.

Additionally, it can be said that in the vast majority of the countries in Group B, effective environmental reclamation and rehabilitation and mine closure, even where mandated, are still highly problematic. This is because many existing laws and regulations are too general to serve as a basis for enforcing compliance. In many countries, mine closure requirements are undermined by inefficient and ineffective monitoring and enforcement, to a large extent, arising because of a lack of financial and technical resources at the national and subordinate levels of government.

Overall, recent mining laws and their associated implementing rules and regulations are beginning to have the necessary requirements to ensure comprehensive mine closure and this trend appears to be accelerating. Therefore, as new policies and legislation are formulated, three major questions that must be addressed are (i) what should government's policies be with respect to mine closure, (ii) what are the major components of an overall mine closure programme that provides for sustainable development and (iii) how might such a policy be implemented.

E. SUMMARY AND CONCLUSIONS

Prior to 1985, the issue of mine closure can be said to have been of a low priority for most countries, as evidenced by the large numbers of abandoned mines that exist in virtually every major mining country. As a result, very few countries had in place, and the majority still do not have, mineral policy and legislation that provide for comprehensive mine closure. The basic components of a comprehensive mine closure policy and associated legislation would (i) provide specific provisions for reclamation and rehabilitation, (ii) require both Environmental and Social Impact Assessments and associated work plans, (iii) have a comprehensive bonding and financial surety programme, (iv) provide provisions specifically for abandonment and post-closure activities and (v) have specific monitoring and enforcement procedures to ensure compliance.

All mining countries have a major problem with abandoned mines and to date none have devised an appropriate and cost-effective means of dealing with the issue. With respect to the above mentioned policies and legislation for comprehensive mine closure, many countries and states e.g. Australia, Bhutan, Bolivia, Burkina Faso, Canada, the Lao People's Democratic Republic, Mongolia, the Philippines, United Kingdom, the United States, Viet Nam and Wales can be said to have comprehensive policy and legislation that provides both for comprehensive mine closure and for post-mining sustainable development. With the exceptions of the above countries, whose policies and legislation have been implemented to varying degrees, the predominate majority of the world's largest mining countries have inadequate policies and legislation for comprehensive mine closure and still fewer provide for post-mining activities and sustainable development.

Comprehensive mine closure for abandoned mines, presently operating mines, and for future mines remains a major challenge for virtually every mining country in the world. To accommodate the need to close abandoned mines and to ensure that existing and future mines are appropriately closed, the cooperation will be required of a diverse stakeholder community, new innovative methods of financing closure and major policy and legislative changes in most countries to ensure post-mining sustainable development.

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