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**Integrated Closure Planning Review  
Literature Review**

Prepared for:

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by

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### **Note to Reader**

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The following is literature review that has been prepared by Social Sustainability Services for the International Council on Mining and Metals (ICMM).

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## 1 CONTEXT

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### 1.1 LITERATURE REVIEW

#### 1.1.1 *Recent Literature on Sustainable Integrated Mine Closure Planning*

Much has been written about mine closure but most of it concentrates on technical rehabilitation matters and not on integrating the planning with the mine life cycle and with social and environmental aspects. The bulk of literature dealing with integrated mine closure planning issues has been published since 1999, although some of the work on which articles are based was done prior to this, going back to about 1991, so there is a pool of literature extending back approximately 15 years. We will discuss the articles reviewed in order of their significance to the development of integrated closure planning principles and practices. As many of the articles appear in collections, we will discuss the articles in each collection in proximity, even if some are less pertinent than others, for ease of reference for readers.

##### 1.1.1.1 *International and Comparative Mineral Law and Policy. Trends and Prospects*

A recent collection of work with a focus on closure planning is the lengthy volume (over 1000 pages), *International and Comparative Mineral Law and Policy. Trends and Prospects*, edited by Elizabeth Bastida, Thomas Wälde and Janeth Warden-Fernández. This volume was published in 2005 but contains work submitted as early as 2002 and therefore based on even earlier research. Of particular interest is the chapter by Wanda Hoskins, entitled 'Mine Closure: the 21<sup>st</sup> Century Approach – Avoiding Future Abandoned Mines'.<sup>1</sup> Hoskins holds the view that the more progressive mining companies today start planning for closure before the commencement of operations. She describes the benefits of early closure planning as the ability to minimize 'the costly need to re-handle material, reshape landforms and restore degraded environments at the last moment'.

Although Hoskins explains that the motivation for many rehabilitation projects comes from the wish to reduce legal and financial liabilities, she says that many companies now choose to go beyond compliance.

Many companies now see their relationships with the public as being at least as important as regulatory compliance. Public acceptance of future mining activity is strongly influenced by its vision of ecological performance at today's sites. The rehabilitation of sites so as to leave a public asset in the form of farmland, recreation reserves or a natural habitat has become an increasingly common policy of mining companies. Site rehabilitation in these cases goes beyond the mere physical stabilization of slopes and pits and providing vegetation cover at the least cost.

In describing the latest good practices in mine closure planning, Hoskins notes the growing recognition of the social costs associated with mine closure as well as financial and environmental costs. She notes that 'many companies are starting to discuss mine-closure impacts with the community in advance of mine construction and operation'. She suggests that social impact assessments might become the tool for addressing social impacts in the same way that environmental impact assessments have become the tool for measuring a mine's environmental impacts. A further emphasis in this chapter is that small and medium-sized

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<sup>1</sup> Bastida, E. Wälde, T. and J. Warden-Fernández (eds), *International and Comparative Mineral Law and Policy. Trends and Prospects*, The Hague, Kluwer, 2005, pp. 627-639.

companies need to be encouraged to commit themselves to environmental stewardship and best practices.

Another interesting chapter in the Bastida volume is 'Mineral Policy: a World Bank Perspective' by Paulo de Sa.<sup>2</sup> He talks about the soundest mining projects being those where a strong trilateral dialogue exists between the mining company, the local community and the various levels of government. The most successful projects were those where the mining company supported the growth in local community capacity to supply the mine with goods and services until they achieved a sustainable standard of business. This company support commenced in the early stage of the operation of the mine. De Sa provides the following excellent description of sustainable community development with a focus on closure.

Unlike in the past, where the community interactions were largely built on philanthropic actions, the process of enhancing social and economic development at the local level can best be achieved through carefully designed public/private partnerships. It is essential to create a climate of trust and co-operation in dealing with key issues, such as (i) access to land and water; (ii) resettlement and compensation for lost assets and income; (iii) development programs centered on asset creation and social capital formation; and (iv) preparation for mine closure. Local communities are expected to assume ownership of these initiatives with a view to achieving long-term stability and sustainability after mine closure has taken place.

He concludes this statement with an observation on the importance of integrating mining programs with decentralized management of natural resources, i.e. regional development plans.

#### 1.1.1.2 *Mining for Closure: Policies and Guidelines for Sustainable Mining Practice and Closure of Mines*

An interesting book that appeared in 2005 about mine closure planning in Europe was written by Philip Peck. The document emerged as part of the aftermath of the catastrophic tailings dam failure in Romania that contaminated the Danube River. Its aim was to support the articulation and adoption of policies, practices and guidelines for sustainable mining for closure and closure of mines in South-Eastern Europe and the Tisza River Basin.<sup>3</sup> Peck's main goal in this volume is to articulate his concept of *mining for closure*, which he describes as encompassing:

- the definition of a vision of the end result for mining land that sets out concrete objectives for implementation;
- ensuring that the mine closure plan is an integral part of a project life cycle;
- the preparation of a mine closure plan early in the process of mine development and in consultation with the regulating authority and local communities;
- the explicit inclusion of environmental, social and economic aspects in the planning for mining operations;
- allowances for review and evolution that stretch from the pre-mine planning phase, through construction, mining, and mine closure to post-mine stewardship.<sup>4</sup>

Although more tightly geographically-focused than many of the articles discussed in this chapter, and not a light read at over a hundred pages, it is nonetheless worthwhile reading for a thorough treatment of closure planning issues. For this review, the main point to note is that Peck recommends **integrated** closure planning as the best possible practice – including social,

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<sup>2</sup> *Ibid.*, pp. 493-504.

<sup>3</sup> Peck, P., *Mining for Closure: Policies and Guidelines for Sustainable Mining Practice and Closure of Mines*, Geneva, UNEP, 2005, p. ii.

<sup>4</sup> *Ibid.*, p. vi.

environmental and economic aspects, ensuring that communities are consulted and that planning is conducted early in the mine development process and made part of the project life cycle.

### 1.1.1.3 *Environmental Policy in Mining. Corporate Strategy and Planning for Closure*

An earlier collection of articles which does focus on closure is the 2000-published *Environmental Policy in Mining: Corporate Strategy and Planning for Closure*, edited by Alyson Warhurst and Ligia Noronha. The chapter entitled 'Integrated Environmental Management Through Planning for Closure from the Outset: The Challenges' by Warhurst and Noronha gives an excellent explanation of the range of reasons why integrated closure planning is good practice, viz.,

The attractiveness of the concept of planning for closure as a whole of life cycle approach to managing the environmental impacts of mining from the development stage through operations to closure is rooted in what may be referred to as the time factor. The greater the time lapse between the occurrence of environmental damage and its remediation, the greater (in most cases) will be the resources (both human and financial) needed to address the problem.<sup>5</sup>

The rest of the chapter analyses in detail the evidence for early and continuous closure planning being the optimal environmental management system. Although principally concerned with matters of environmental science, the authors also note that adopting a consultative closure planning process makes good commercial sense. They say that involving local community members in scoping for the EIA, identifying impacts and designing rehabilitation programs ensures a lessening of conflicts with the mine's neighbours. They also point out that, by including the local community, the company 'also ensures that the plan they arrive at for the post-mining land is one that has the approval of the local community.'<sup>6</sup>

Another chapter in the volume that focuses solidly on the importance of the social aspects of closure, is the one written by Warhurst with Magnus Macfarlane and Geof Wood - 'Issues in the Management of Socioeconomic Impacts of Mine Closure: a Review of Challenges and Constraints'. The most crucial aspect of their argument is that social impact assessment (SIA) is essential for understanding the unique aspects of each mine's human environment, which varies enormously. They reiterate the importance of early and dynamic closure planning and state that the SIA must be integrated with the closure planning process if closure is to be done well. If this process is well-grounded from the outset, then maintaining the currency of the closure aspects of the closure plan need not be costly. They explain this in the following manner.

Without conducting such an assessment [SIA] from the outset, the potential impacts of closure prior to operation will not be understood by relevant stakeholders. This could dramatically affect whether construction proceeds, how it proceeds, and the mitigation and compensation mechanisms to be adopted when production is achieved. Once this has been conducted, inexpensive ongoing participatory monitoring on behalf of the community and the company will facilitate the iterative identification of deviations from the proposed actions; evaluation of changing needs; unanticipated impacts; and potential impacts through to when closure or downsizing are eventually realized.<sup>7</sup>

The chapter illustrates how integrated closure planning can inform innovative recruitment policies, employee housing schemes and other operational and management programs that can be cost-effective during production, in addition to more successful post-closure programs. It comments upon the benefits of partnerships with communities and government agencies in working toward programs for economic diversification sustainable beyond the life of the mine.

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<sup>5</sup> In Warhurst, A. and L. Noronha (eds), *Environmental Policy in Mining. Corporate Strategy and Planning for Closure*, Boca Raton, Lewis, 2000, p. 15.

<sup>6</sup> *Ibid.*, p. 26.

<sup>7</sup> *Ibid.*, p. 90.

An additional important point is the value of transparent discussion of closure planning with employees, union, government and community members. The authors recognize that many companies are wary of discussing closure for fear that there may be negative reactions from shareholders, employees and community members. To the contrary, they claim that the presence of well-conceived, co-operatively planned and frequently updated closure programs will give all parties the confidence needed and trust in the mine's management to guarantee smooth transitions and good relationships. In this vein, they make the further salient point that closure bonds should be required by regulation to cover social as well as environmental issues.

There are more than twenty other chapters on various aspects of closure planning in this volume, covering a wide range of technical and ecological issues as well as providing case studies and lessons from all over the world. It is a very useful collection.

#### *1.1.1.4 Mine Closure and Sustainable Development : Results of the Workshop organized by the World Bank Group Mining Department and Metal Mining Agency of Japan*

Another collection of mine closure articles of roughly the same vintage as the Warhurst collection is *Mine Closure and Sustainable Development : Results of the Workshop organized by the World Bank Group Mining Department and Metal Mining Agency of Japan*, edited by Tracy Khanna in 2000.<sup>8</sup> This volume was the result of a conference organized in Washington, D.C. by the World Bank and Metal Mining Agency of Japan (MMAJ), aimed at discussing the following issues.

If closure of mining activities takes place in an unplanned manner, disruption of social services together with a downturn in economic activities are the likely outcome in a mining region. Therefore, a planned and rational approach is needed to alleviate direct or indirect impacts on the people and economies affected by mine closure.

You will notice that the focus was on social and economic aspects of closure planning, not the technical aspects which are dealt with far more extensively and competently in the normal course of events in most mining operations. Richard T. Jackson, in the introductory chapter, makes the point that environmental, let alone social, monitoring and management of many mines may last for decades. 'Thus, we can conclude that mine closure and subsequent monitoring will, in most cases, occupy a period much longer than mining itself.'<sup>9</sup> For this reason, Jackson advises that mine closure planning should be a standard part of mine operations planning from the first proposals, not just in the final months before closure.

Jackson's chapter is a very important contribution to the closure planning debate. He discusses crucial matters such as that the most important legacy that a mining operation may make is in the training and professional experience of employees, preferably including a large number of local people, and that planning for their redeployment post-closure must start well before the actual approach of closure if there is to be any long-term benefit from their increased skills levels. Further, he tackles the difficult issue of mines assuming the role of government in providing much needed local services such as hospitals and schools, which may then fall into disrepair after the departure of the mining company, as they were never really 'owned' by the local community and government, and they did not develop sufficient capacity to manage these institutions sustainably themselves.<sup>10</sup>

Some of Jackson's suggestions for avoiding these pitfalls include designing the mine's infrastructure from the outset with the post-closure needs of local communities in mind, which implies using community input in the design process and may mean siting infrastructure in

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<sup>8</sup> Khanna, T. (ed.), *Mine Closure and Sustainable Development : Results of the Workshop organised by the World Bank Group Mining Department and Metal Mining Agency of Japan*, London, Mining Journal Books, 2000.

<sup>9</sup> *Ibid.*, p. 6.

<sup>10</sup> *Ibid.*, p. 8.

locations more suitable to local villages than to mining operations, and working to dovetail mining development plans with regional government and community plans, so that they do not become the sole responsibility of the mine. By achieving these goals, there is a much greater chance that community development programs sponsored by mines will become sustainable and not just nice programs run by the mine's management during the operation of the mine.

Jackson is sympathetic to the vagaries of forecasting involved in mineral economics, i.e. no-one really knows when a mining operation commences how long it will last or where all the desirable ore bodies will be. Therefore, it is essential that continuous and frequent closure and community development planning discussions are maintained with stakeholders, especially local communities. Arthur Hood's case study of the Misima mine in PNG bears this out, when he says that the:

closure planning (subsequently sustainability planning) process has resulted in the company getting heavily involved in a wide range of activities which were not originally anticipated. This in turn has led the company into developing a network of collaborative partnerships which are continuing to expand. One thing we have discovered is that planning for sustainability is an evolutionary process, the course of which is difficult to determine in advance.<sup>11</sup>

Hood's remarks illustrate perfectly the reasons why industry observers and commentators advocate early, integrated closure planning that includes social aspects as much as environmental and geophysical elements.

#### *1.1.1.5 Framework for Responsible Mining : a Guide to Evolving Standards*

A recent publication which covers closure planning issues is the October 2005 *Framework for Responsible Mining : a Guide to Evolving Standards*, written by Marta Miranda, David Chambers and Catherine Coumans.<sup>12</sup> This is a challenging document, written from the perspective of NGOs, which covers a wide range of mining-related issues and does so by describing the current situation in the industry and recommending actions to be taken to improve the status quo. Unlike the collections of articles discussed above, this is an advocacy document and consequently takes some strong stances, some of which may be viewed as inimical to the mining industry, although the authors have generally tried to be balanced. Although the document covers social and cultural issues associated with mining impacts extensively and also has a technical examination of closure planning and post-closure maintenance issues, the chapters dealing with these issues were written separately by one or other of the three authors, each with expertise principally in their chosen field. Hence, there is little integration of social issues in the closure planning discussion. Nonetheless, the authors do concur with the major aspects of integrated closure planning. For example, Chambers states that

[m]ining companies, international financial institutions, and NGOs generally agree that a reclamation plan should be drafted during the proposal stages of mine permitting and planning, and that such a plan should include a detailed cost estimate for reclamation. Early drafting of the plan is important because the mine operator, regulators, and the public need to know what the area will look like after reclamation, whether the proposed reclamation scheme is technically feasible and affordable and whether there are sufficient funds to carry out the reclamation tasks if the operator were to go bankrupt.<sup>13</sup>

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<sup>11</sup> Hood, A. 'From Community Relations to Community Development' in Khanna (ed.) *Mine Closure and Sustainable Development*, op. cit., p. 88.

<sup>12</sup> According to the introductory sections of the framework, Miranda works for WWF, Chambers works for the Center for Science in Public Participation (CSP2), a nonprofit corporation providing technical advice about mining matters and Coumans works for MiningWatch Canada.

<sup>13</sup> Miranda, M., Chambers, D. and C. Coumans, *Framework for Responsible Mining : a Guide to Evolving Standards*, 19 October 2005, available at [www.frameworkforresponsiblemining.org](http://www.frameworkforresponsiblemining.org), pp. 38-40.

He continues that the pre-mining closure plan needs to be periodically updated, perhaps every three to five years, to keep the technical implementation and costing details current and valid. Although, in general, Chambers' contributions to the framework focus on technical rather than social issues, he goes on to say that the 'future use of the reclaimed mined land should be clearly defined through a participatory process so that the public can evaluate the land uses that will be available after mining, and so that reclamation planning can be focused on this goal...as more effort needs to be placed on ensuring meaningful public input and reaching true consensus on a final land use designation.' This describes the integration of social and environmental aspects of closure planning and therefore paints a picture of the goal that the mining and metals industry is aiming for.

Chambers also recommends addressing the possibilities and costs for backfilling during the planning stage for a mine and points out that backfilling can be more economical than transporting waste rock or building dams, as long as it is integrated into the mine's planning processes in order to take maximum advantage of potential synergies. He also advocates that the industry should support community-based environmental monitoring, in whatever form is desired by affected communities, which is a position that would go beyond the current performance of most mining companies, but is the logical extension of true stakeholder engagement practices.<sup>14</sup> Catherine Coumans' sections of the Responsible Mining Framework document deal only glancingly with closure planning issues. They delve deeply into stakeholder engagement, particularly into indigenous host communities' participation in decision-making processes. Coumans specifically mentions closure planning in the context of the company disclosing to community members information about 'just transition' arrangements both for company employees and local community members post-closure.<sup>15</sup>

This review of the latest literature on closure planning has revealed strong agreement on the importance of integrated closure planning and the elements which make it up. Integrated closure planning is a dynamic process which must commence in tandem with the other planning aspects of a mining process and must contain social and environmental aspects at the same core level of planning importance as waste management and revegetation, the more traditional rehabilitation components of closure plans. Issues of sustainable economic programs and closure cost provisions as well as participatory monitoring are also prominent aspects of best practice. It will be this approach to sustainability planning that will give the greatest chance of longevity to an industry designed to exploit a non-renewable resource – proof that there can be long-term benefits to the people whose environments are affected by mining operations.

## **1.2 LEGAL AND REGULATORY REVIEW**

### **1.2.1 Overview of sources and objective**

Relevant laws and supporting regulations were reviewed from a number of countries including Australia, Canada, India, Papua New Guinea, South Africa and the USA. This review does not aim to be a comprehensive treatment of mining laws and the role of closure in them, as that would be beyond the scope of the current project. Rather, we have sought to examine the laws pertaining to mine closure in major mining countries and those which have particularly progressive or interesting rules. In addition to this legislation, the mine closure guidelines from Australia (ANZMEC) and the World Bank and International Finance Corporation (IFC) were appraised. Several papers which summarized mine closure legal frameworks were evaluated, with the most useful being<sup>16</sup>:

- the MMSD-commissioned report *Research on Mine Closure Policy* (2002) by Cochilco, the Chilean Copper Commission;

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<sup>14</sup> Ibid., p. 46.

<sup>15</sup> Ibid., pp. 64, 68.

<sup>16</sup> Find full details of all these documents in Section 6: References.

- *An International Overview of Legal Frameworks for Mine Closure* (undated, c. 2001) by A. Clark and J. Cook-Clark.

The following is a summary of the main issues from this review, framed in the context of issues raised in the ICMM mine closure questionnaire and during the interviews.

## **1.2.2 Review of Mine Closure Legislation and Regulations**

The most notable feature of the legal frameworks reviewed is the diversity of legal mechanisms and requirements which pertain to project/mine closure. Although very few countries and their constituent states/provinces have enacted specific mine closure regulations, there is a recent trend towards the development and implementation of regulations and/or guidelines which relate primarily to mine closure. These documents detail the processes and contents of mine closure plans in addition to clarifying roles and enforcement capacity of the responsible authorities.

### **1.2.2.1 National versus provincial legislation**

In several major mining countries with a federal system of government such as Australia, Canada and the USA, while there are certain nationally-applicable statutes or standards, generally each state or province has individual and differing legislative requirements and responsibilities for regulating mining and the closure aspects of mining activities. By contrast, Chile, India, Peru and South Africa have legislation which is applicable nationally, respectively the South African *Mineral and Petroleum Resources Development Act (MPRDA)* and its supporting regulations, the Indian *Mineral Conservation and Development Rules*, the *Peruvian Mining Law* and the *Chilean Mining Code*. In the European Union (EU) member countries, national or regional statutes can also be overlain by EU-legislation.

### **1.2.2.2 India**

In India there are guidelines which specifically seek to regulate closure planning and management in the regulations supporting the various mineral laws. In 2003, the Indian government amended the Mineral Concession Rules (1960) and Mineral Conservation and Development Rules (1988) by issuing *Guidelines for Preparation of Mine Closure Plan* which required all mining leaseholders to submit a Progressive Mine Closure Plan within 180 days of the notification and a Final Closure Plan one year prior to the proposed closure of a mine. Whether or not all operations have complied with this notification, the Indian government has indicated its seriousness about early and progressive rehabilitation and closure planning.

The preamble to the guidelines states that 'Mine closure operation is a continuous series of activities starting from day one of the initiation of mining project' and that the progressive mine closure plan will become an additional part of the existing mining plan and will be reviewed every five years. Although the guidelines do not describe a comprehensive and integrated form of closure planning in the sense that there is no requirement for stakeholder engagement, there are social aspects included such as provisions for retrenched workers and 'envisaged repercussions on the expectations of society around [sic] due to closure of mine' they are nonetheless a marked step forward in closure planning regulations.<sup>17</sup> The stated goal of the guidelines is to prevent rehabilitation becoming a burden to society after a mine has closed and to create a 'self-sustained ecosystem' which certainly has an integrated closure planning ring to it.

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<sup>17</sup> Guidelines found at <http://ibm.nic.in/mineclosuregl.html>, accessed 5 April 2006.

### 1.2.2.3 South Africa

In South Africa, the MPRDA Regulations require as part of the approval process the preparation of a social and labour plan which must include ...*mechanisms to ameliorate the social and economic impact on individuals, regions and economies where retrenchment or closure of the mine is certain.*<sup>18</sup> In conjunction with the MPRDA of 2002, the Department of Minerals and Energy, the Chamber of Mines, the South African Mining Development Association and the National Union of Mineworkers signed the Broad-Based Socio-Economic Empowerment Charter for the South African Mining Industry, or Mining Charter as it is known. On these regulations and agreement, specifically concerning closure plans, the Chamber of Mines of South Africa made the following comment.

Social issues have assumed prominence in closure considerations only recently, and some of the mines need to develop their preparedness further. Another challenge for the sector is to investigate the optimal use of mining infrastructure after closure. This is being integrated with the development of social and labour plans, as well as closure plans and funding requirements. It is very difficult to create alternative economic activities and to provide suitable skills for a fully dependent community at the late stages of a mining operation. Mines are required to have fully costed closure plans in place, and with the advent of the Mining Charter, social and labour plans have to take into account the social effects of dependent societies, including employees.<sup>19</sup>

As all mining operations are required to report annually on their progress towards implementing the MPRDA regulations and social and labour plans against the Mining Charter Scorecard, there is incentive for producing and updating integrated closure plans.

### 1.2.2.4 Papua New Guinea

Papua New Guinea (PNG)'s mining laws were not designed with much attention to closure planning. However, in 2000, a Mine Closure Policy was drafted and discussed with many stakeholders.<sup>20</sup> This mine closure policy was extremely progressive and contained the following principles for mine closure planning.

- i) Appropriate planning will have to be undertaken to ensure that as many benefits as possible from mining are sustained beyond the life of the mine;
- ii) Appropriate planning is also required to ensure that any negative environmental or social impacts from mining activities are minimized during the mine life and eliminated, where possible, after mining operation ceases;
- iii) The mine developer shall be required to inform the State at the pre-feasibility stage on how the company would be planning to work with stakeholders to achieve (i) and (ii) above during and after mining.
- iv) Each mining project in PNG will develop and implement a site-specific mine closure plan.
- v) Integrated mine planning, incorporating exploration, development, operations and closure, will be practiced;
- vi) Integrated mine planning shall address:

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<sup>18</sup> Government of South Africa, Government Notice No. R 527, Staatskoerant, 23 April 2004 *Mineral and Petroleum Resources Development Regulations*, Section 46 (d) (iv).

<sup>19</sup> Chamber of Mines of South Africa, 'The South African Mining Industry Sustainability and Transformation Report 2005: 'Realistic Dreams'', Draft for comment, November 2005, p. 15.

<sup>20</sup> Jackson, R.T., 'Capacity Building in Papua New Guinea for Community Maintenance During and After Mine Closure', MMSD Paper No. 181, February, 2002, Appendix A.

- Conversion of the resource into long-term sustainable capital;
- Undertaking this while minimizing short and long-term negative impacts on the environment and social fabric of the people living in and around the mine affected areas.

These principles encompass an exemplary statement of integrated sustainable mine closure planning, requiring the demonstration at the pre-feasibility stage of plans developed with stakeholders to ensure sustainable benefits of the project. Unfortunately, this mine closure policy appears not to have been adopted by the PNG government, but subsumed into a Sustainable Development Policy.<sup>21</sup> That policy was developed and taken further, being produced as a Green Paper for extensive discussion by stakeholders and open for public comment in 2002. It does not seem to have been taken to the stage of development into legislation yet and can therefore only be presented here as an example of efforts to adopt integrated closure planning practices into law rather than as a law itself. It will be worth watching PNG to see whether the policy does become law and what the provisions are for mine closure planning.

#### **1.2.2.5 European Union**

Various countries in Europe have regulations covering rehabilitation of sites after the cessation of a range of industrial activities. The European Union (EU), as the central regulatory body for Europe, is trying to produce a unifying regulation or directive to regulate the management of waste from the mining and quarrying industries. The primary driver for this move is the recognition of the dangers posed to human health by mismanaged chemical wastes. The proposal seeks to introduce EU-wide rules designed to prevent water and soil pollution from long-term storage of waste in tailings ponds, waste heaps, and so forth. The directive is known as the European Community Draft Directive on the Management of Waste from the Extractive Industry.

One of the key provisions of the directive is that operators of waste management facilities should draw up closure plans as an integral component of the overall operating plan. Proper monitoring will also be required during both the operational and the after-care phases. Although this regulation is not aimed exclusively at mines, and is primarily concerned with technical issues rather than the broader integration of social with environmental planning, it nonetheless represents a step toward the integration of certain aspects of mine closure planning into the operational planning processes of mines in Europe. In addition, several banks in Europe have developed the Equator principles which include a requirement for fully funding a mine's closure plan by appropriate instruments so that the cost of closure can be covered at any stage in the mine life, including premature and unforeseen closure.<sup>22</sup>

#### **1.2.2.6 Australia and New Zealand**

Australia and New Zealand, through the Australian and New Zealand Minerals and Energy Council (ANZMEC – made up of government ministers) and the Minerals Council of Australia (MCA – the national industry body) developed guidelines on closure, the *Strategic Framework for Mine Closure* (2000), which addresses objectives and principles of mine closure; and is applicable (but not enforceable) to Australian mining companies operating both within and outside of Australia. The framework includes guidelines on stakeholder engagement and advises that closure planning should be integral to life of mine planning, and therefore advocates integrated mine closure planning. The ANZMEC Framework was largely formulated in response to the introduction in 2000 of the Australian Commonwealth *Environment Protection and Biodiversity*

<sup>21</sup> Filer, C. 'The Role of Land-Ownning Communities in Papua New Guinea's Mineral Policy Framework' in Warhurst & Noronha, *op. cit.*, p. 929 and 'Horses for Courses: Special Purpose Authorities and Local-Level Governance in Papua New Guinea', RSPAS Discussion Paper 2004/6, Canberra, Australian National University, 2004, p.1.

<sup>22</sup> Peck, P., *Mining for Closure: Policies and Guidelines for Sustainable Mining Practice and Closure of Mines*, Geneva, UNEP, 2005, pp.26-8.

*Conservation Act 1999*, which established a new and nationally-consistent framework for environmental assessment of new projects and variations to existing projects. Under Australia's federal system, the Commonwealth legislation is only applicable in areas under national jurisdiction, on projects where matters of national environmental significance are concerned, such as mining in national parks or World Heritage areas, or which may have impacts on threatened or migratory species.

The Australian Federal Government is currently revising the Best Practice Environmental Management in Mining booklets produced in 1995 by the Department of the Environment and Heritage under the Sustainable Minerals series. The booklets were first to provide guidance on environmentally sound management in the mining industry and are now being reviewed and the scope broadened to provide a sustainable development focus. One of the booklets will focus on Mine Closure and Completion. They are expected to be published in 2006.

Issues related to mine closure are becoming an important consideration in the assessment process for mining proposals in Australia. This is evidenced by the fact that in February 2006, the Western Australian (WA) Government issued new *Guidelines for Mining Proposals* which include a section on Mine Closure and which require the submission of a mine closure plan when the mining proposal for a new project is submitted. WA is the largest state in Australia, in terms of land mass, and also the state which contains most mining activity. The WA guidelines provide specific reference to both the ANZMEC framework and the ICMM Sustainable Development Framework, which are reproduced in an Appendix to the WA Mining Guidelines. The Guidelines advise that mine closure planning must be commenced in the initial stages of mine planning, that mine closure plans should be revised annually and that post-closure land use options should be discussed with stakeholders. The Department of Industry and Resources, responsible for issuing and overseeing these guidelines, intends to ensure adherence to them by means of an Annual Environmental Report (AER) that must be submitted each year by each mining project. These guidelines go far beyond the traditional rehabilitation plans that are the standard fare of mine closure planning regulations and are a good example of regulators working towards integrated mine closure planning.

The other two states of Australia where most mining takes place, Queensland and the Northern Territory, do not have regulations that are quite so up to date with the latest standards for closure planning, although rehabilitation plans and public comment on proposed large mining projects are standard operating procedures in all parts of Australia. The Queensland Environmental Protection Agency requires the submission of an operations plan that includes rehabilitation actions, prior to commencement of operations, and requires that it be frequently reviewed, but does not specify stakeholder engagement in closure planning. However, the Queensland Mineral Council issued Guidelines for Mine Closure Planning in 2001 that recommended stakeholder engagement and referenced the ANZMEC Framework, so many companies are already engaging stakeholders in closure planning processes. The Northern Territory's *Mining Management Act* of 2001 requires the development of a mining management plan that includes a plan and costing of closure activities, but does not detail broader involvement in the process, although the NT's environmental impact assessment process usually requires considerable stakeholder engagement prior to project approval, including on rehabilitation and decommissioning issues, so in practice there is community involvement in closure planning.

### **1.2.2.7 North America**

The Canadian situation is rather similar to the Australian, in that provincial governments are responsible for mining laws and regulations in their jurisdictions. The national government of Canada only has mineral jurisdiction over federal territories and offshore. British Columbia regulations require the submission of a reclamation plan at the time of applying for mining authority, but do not specify the inclusion of social aspects nor stakeholder engagement. Similarly, many of the other provinces whose legislation we examined, for example Manitoba,

Alberta, Ontario, Newfoundland and Labrador contained requirements for reclamation plans but no particular inclusion of social or stakeholder engagement provisions. In much the same way as the Queensland and Northern Territory situations, however, these requirements may be covered in practice by EIS regulations.

The USA, as another federal system, seems to be in a similar position to Canada and Australia.<sup>23</sup> Danielson and Nixon explain that 'mine closure for hard rock mines is dealt with at the state level in the American federal system. There is a great deal of variation in the state experience. Some states have had programs for well over two decades, with very experienced staff, a reasonable level of resources and significant practical experience with the nuances of mine closure planning; other states have only adopted programs recently and have yet to fully institutionalize their systems.' In spite of this, almost all US states have similar basic concepts in their closure planning systems and these cover technical standards, the need for revision, public comment opportunities, bonding, monitoring and enforcement. The Danielson paper does not focus on social issues with respect to their inclusion in mine closure planning systems but does discuss the public participation processes in various states, noting that some states have narrower definitions than others of which classes of people constitute stakeholders with a right to comment. There is a practice of public notification, however, and 'in general, the agencies apply a very broad definition of 'interested parties', calling any doubts in favour of allowing participation.'<sup>24</sup>

With reference to the evolution of reclamation regulations in Canada and the USA, Cochilco commented that, having begun with an 'initial concern for issues of human health and safety, the regulations have over time evolved to the point where almost an equal emphasis is now placed on the preservation of environmental values.'<sup>25</sup> The paper further commented that heightened public awareness was the principle driver for this process of evolution and expected it to continue, perhaps to the stage where stakeholders will be fully integrated into the closure planning process.

#### **1.2.2.8 World Bank Group**

A useful guideline to what is required in integrated mine closure planning was issued by the World Bank Group's Mining Department and the International Finance Corporation in 2002. Entitled '*It's Not Over When It's Over: Mine Closure Around the World*' it is a concise and practical overview of the issues involved in integrated mine closure planning.

The International Finance Corporation (IFC), the private sector arm of the World Bank Group, is now concentrating on producing sustainability policies and performance standards.<sup>26</sup>

#### **1.2.3 Mine Closure Requirements in Environmental and/or Social Impact Assessment**

In the absence of specific project/mine closure legislation; some attributes of mine closure are captured within mining legislation while others are covered with Environmental Impact Assessment (EIA) regulations and labour regulations. The inclusion of community and social components of closure are incorporated into some EIA regulations, for example, in the case of the Northern Territory noted above. EIA regulations with strong social and community terms of reference have been renamed as Environmental and Social Impact Assessments (ESIA) or Social and Environmental Impact Assessments (SEIA) and include sustainability requirements beyond the life of the project. Employee aspects of closure such as redundancy and retraining

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<sup>23</sup> Danielson & Nixon, 'Current Regulatory Approaches to Mine Closure in the United States' in Warhurst, A. and L. Noronha (eds), *op. cit.*, pp. 311-350

<sup>24</sup> *Ibid.*, p. 329.

<sup>25</sup> Cochilco, *Research on Mine Closure Policy*, MMSD Research Paper No. 44, January 2002, p. 12.

<sup>26</sup> Pers. Comm. J. Middleton, IFC to G. McGuire, 11 February, 2006.

are not usually included in the ESIA but may be covered in industrial relations or labour legislation.

## **1.2.4 Important elements of mine closure regulations**

### **1.2.4.1 Financial Guarantee**

Reclamation bonds or financial guarantees are generally included in mining regulations and guidelines in sections that relate to the rehabilitation of sites. The procedures used to determine the financial guarantees vary widely both between and within countries. With the exception of the USA (FAS143), the calculation of the financial guarantee or bond is usually based on generic estimates over the life of the project and in some regulations may be discounted due to the favourable rehabilitation performance of the mine. The enforcement provisions may be linked to the bond with penalties for lack of progress and mechanisms for claiming back guarantees following completion of agreed work. In comparison, the USA's FAS143 requires annual or quarterly detailed estimates of the liabilities related to the current financial year. ICMM has already undertaken a detailed review of financial assurance practices, so we will not go further into that matter in this review.<sup>27</sup>

### **1.2.4.2 Responsible Authorities**

The responsible authorities that a project/mine needs to deal with in relation to mine closure generally differs in each country and state/province. Usually it is combination of the state/provincial mining department and environmental departments but can also include national and local agencies for particular aspects of mine closure such as water, biodiversity or community programs.

The development of a specific mine closure regulation can simplify this process, however, it may be inappropriate for the government department responsible for promoting mining to be the same government department regulating the closure of the mining project. There is also the issue of whether one or more bodies should oversee the closure as posed in the MMSD *Research on Mine Closure* report:

It seems that it works better to have an independent mine closure law that establishes a single agency to implement the law. This model gives the business community an assurance that one agency will take the lead on its problems and that it will not have to answer to many differing opinions on how operation, reclamation and closure success will be measured. This model also allows the public and NGOs a single place to go for information on mining regulation.<sup>28</sup>

For example, the setting of closure objectives and targets for environmental aspects requires the input from environmental specialists within the government and these practitioners are usually located within Environmental Departments and are guided by Environmental Protection legislation. Mining legislation may not have the powers of enforcement attributed to environmental legislation and staff may not have the expertise required to audit and enforce legislation.

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<sup>27</sup> See Miller, C.G., *Financial Assurance for Mine Closure and Reclamation*, London, ICMM, February 2005.

<sup>28</sup> Cochilco, *op. cit.*, p.4.

### 1.2.4.3 Site Relinquishment

The relinquishment of a closed site without clear legal guidance or specific closure targets can be an extremely difficult process which is compounded when dealing with multiple authorities, agencies and landowners. None of the legislation reviewed had documented mechanisms for relinquishment of sites which were based on comprehensive objectives and targets for all environmental and social components of a closure plan. The list of agreed closure works, rehabilitation requirements and water quality standards usually formed the basis of most relinquishment procedures. None of the legislation reviewed specified the development of community or social objectives and targets which could be assessed at relinquishment.

### 1.2.4.4 Stakeholder Engagement and Participation

The requirement or opportunities for involvement of stakeholders in mine closure planning and implementation is inconsistent throughout the legal frameworks reviewed. The opportunity for public comment is now standard practice in most EIA and some mining activities governed by legislation, however, a mechanism for ongoing and participatory engagement was generally absent in the legislation. Without ongoing input and involvement from stakeholders the opportunities for partnerships and sustainability beyond the life of the operation are extremely limited.

### Issues summary

The following table summarizes the issues described in the preceding discussion. The accuracy of the information is limited by the availability and precision of data available on the worldwide web and in published papers which may have been superseded by recent legislative developments in the countries listed below.

Country	Specific MC Legislation	ESIA or SEIA	Financial Guarantee	Enforcement Provisions	Relinquishment Procedure	Stakeholder Engagement
USA	No	Only EIA	Yes – FAS143	Yes	No	Yes – public comment through EIA
Australia	No but ANZMEC guideline	Only EIA, includes some SIA	Yes – varies between States	Yes	No	Yes – public comment through EIA
Canada	No	Only EIA	Yes – varies between Provinces	Yes	No	Yes – public comment through EIA
South Africa	No	Yes	Yes	Yes	Yes – limited to Env objectives	Yes – public comment of Env management plan
India	Yes	Yes	Yes	Yes	No	No
Peru	Yes	Yes	Yes	Yes	No	Yes – public comment of closure plan

NB. There are various terms for environmental and social or socioeconomic impact assessments. ESIA or SEIA are common abbreviations for various versions of these, as are EIA and SIA if separate assessments are produced for each area of impact.

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