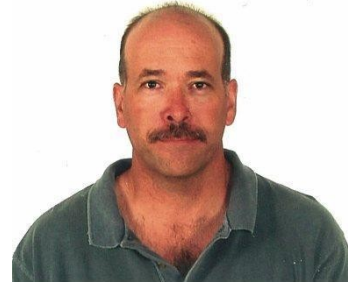


MINE CLOSURE 2006
Proceedings of the First International Seminar on Mine Closure
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This review is by necessity something of a paraphrasing of portions of the proceedings. Mine closure, in part or in whole, rightly deserves the undivided attention of mining companies, their consultants and their contractors in order to meet sustainability targets and to minimize negative environmental, social and economic impacts, as the project, in its post-closure years, will become the legacy we leave to our children and grandchildren. The actual performance of mine closure, that is, nature's determination of the success of the closure, is a key deciding factor of the public's assessment of the future viability of the mining industry. Without society's consent, it may be quite difficult for the mining industry to carry on mining in many areas of the world. Thus, establishing good mine closure practices is paramount to the continued good reputation of all world-class mine operators. The back cover of the proceedings puts it very well:

The economical and environmentally and socially acceptable closure of mines is one of the greatest challenges facing the mining industry in this new century. Increasingly, the future approval of new operations and the continuing social licence to operate at existing operations will become contingent on a company displaying a proven track record of appropriate and successful closure of old or uneconomic mines. Although there are many examples of good closure practice, there are also many that have been unsuccessful and it is the latter that generate most public scrutiny. A consequence of this scrutiny, and the desire of mining companies to adopt best practice in mine closure, has seen a very rapid increase in the financial provisions that are being made for closure at some, as-yet undetermined date.

It was with the recognized on-going need to develop mine closure practices that are environmentally and socially sustainable, and are based on principles of sound planning and economics that the conference was organized. The proceedings are presented in 8 sections plus a plenary session. The 8 sections are:

- Planning for Closure,
- Ecosystem Reconstruction and Pedogenesis,
- Hydrology of Post-Mining Landscapes,
- Financing Closure,
- Landform Stability,
- Containment Risks and Off-Site Impacts,
- Success Criteria, and
- Social Impacts.

The plenary papers, while quite interesting and worthy of a thorough discussion, are not reviewed separately from the remainder of the proceedings, as they represent areas of the 8 sections identified above.

Session 1: Planning for Closure. This chapter makes up the lengthiest portion of the proceedings. That is something of a statement of where the mining industry's closure attention is being paid. There are several papers describing regulatory frameworks and closure policies adopted by several mining companies. One paper underscores the importance of mine closure planning by describing how their closure manager is second only in their organizational chart to the mine's operations manager. The focus of many papers pertains to the necessity of formulating closure plans well in advance of its implementation in order to ensure there is sufficient cash flow, that necessary materials are located and strategically placed, that a fleet of mining equipment is present, etc, with the recognition of the inherent uncertainties that may develop during a mine's life. Proper planning at the developmental stages of the mining operation can result in significant cost savings. This chapter, with contributions from over a dozen countries, contains tremendous information, much in tabular form, and also several flow diagrams explaining strategies used in various closure projects.

Section 2: Ecosystem Reconstruction and Pedogenesis. This chapter presents several interesting papers with variations around its central theme. The need for experimentation during the mine life is discussed, as is strategies for soil amending. One paper of particular interest presents a case for setting small vertebrate colonization as an ultimate metric against successful reclamation, as the formation of complex vegetation is typically needed for such occurrence. Another paper details the need to sow different seed varieties at different times of the year to better suit their natural emergence.

Section 3: Hydrology of Post-Mining Landscapes. This chapter presents papers on risk-based design, and the need for good modeling and field trials to ensure covers are built adequately and with regard to a broad range of conditions and occurrences.

Section 4: Financing Closure. This chapter contains papers on a variety of topics related to the financial side of mine closure work. Many papers detail various legal frameworks in place regulating closure bonds and sureties. A number of papers make reference to in-perpetuity costs, indicating the elusive nature of walk-away solutions. One interesting paper discusses how closure projects are treated quite differently than capital projects, in that their costs are typically not as well established as with capital projects, even though it is the capital projects that can be cancelled, not closure projects (one paper introduces the concept of *bankable feasibility closure design*). Significant uncertainty in the estimation of closure costs may best be dealt with using financial risk modeling.

Section 5: Landform Stability. This chapter presents a handful of papers, largely dealing with erosion of mine waste materials and their covers, especially in regard to long-term performance. It is evident that great strides have been made recently in soil erosion modeling; those advances should be of direct benefit to good closure practices.

Section 6: Containment Risks and Off-Site Impacts. This chapter presents papers focusing on topics ranging from remote sensing and pit lake prediction models to water quality and risk assessments, and many other topics. These papers serve as very useful sources of such information.

Section 7: Success Criteria. Success criteria are measured in several ways. The authors of papers in this chapter present cases for closure success based on flora, fauna (including invertebrate population), and landscape. The success of a closure system is said to be one

that can support and maintain a balanced, integrated, and adaptive community of organisms having a species composition, diversity and functional organization comparable to that of the natural habitat of the surrounding region.

Section 8: Social Impacts. The final chapter of the volume presents the sometimes sobering issues of the social impacts of mining on communities and populations, especially with regard to mine closure. In areas of the world where unemployment is problematic, the closing of a mine can have serious impacts on the local population. The concept of sustainable development and leaving useful infrastructure for subsequent industry are the topics of several papers.

The proceedings of the Mine Closure 2006 conference contain a very diverse and useful collection of papers. Any serious practitioner wanting to remain current with the state-of-the-industry should consider adding this volume to their collection.