

MANAGING AND ESTIMATING CLOSURE AND RECLAMATION LIABILITIES - A PRACTITIONER'S VIEW¹

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Abstract. With the global mining industry's focus on Sustainable Development, there has been a significant emphasis on mine closure and reclamation performance and reporting through the development of the International Council on Mining Metals (ICMM) Sustainable Development Framework and Principles, the Minerals Council of Australia's (MCA) Enduring Value Framework for Sustainable Development, the Global Reporting Initiative (GRI), and the Equator Principles. In addition financial reporting obligations under International Financial Reporting Standards and the Sarbanes-Oxley Act (2002) have also led to better understanding and improvements with industry closure performance, liability management, and reporting, and provide improved guidance on evaluating and measuring liability. Under these sustainable development principles and financial reporting obligations, mining companies are required to self-regulate their compliance to these obligations for mine closure planning and associated cost estimates across all life cycle phases of their mining projects. Internal processes should be developed within mining companies to better understand their closure liabilities and obligations. The likely closure costs and cost estimating processes should be developed for long-term life of mine (asset) planning and budgeting, financial reporting for corporate balance sheet provisioning purposes, and regulator reporting for environmental bonding and financial assurances. Mining companies need to plan for, prepare, and actually "mine for closure" right from the start of a project. This means that their closure and reclamation liabilities throughout each stage of the mine life cycle phases; exploration, during feasibility studies and mine construction, start-up and operations through to the last day of production and beyond, must be understood, planned for, managed, and controlled. This paper will discuss how these closure liabilities are calculated, how they are utilised internally within an organisation and what must they deliver in terms of improvement, performance, and reputation. Early recognition of closure and reclamation liabilities promotes improved strategies for operations to plan additional mitigation strategies and anticipate progressive closure and rehabilitation activities. Closure planning creates shareholder value if these long-term liabilities can be reduced or eliminated during operations. A well-established closure planning process combined with a closure and reclamation cost estimating process ensures investment, development, and operating decisions made today are made in full recognition of the potential financial impacts for closure in the future.

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Industry Closure Cost Estimation Processes

With the industry's focus on maintaining access to resources, often defined broadly through the generic term "Social Licence to Operate," a term that calls for resource companies to be more open and transparent, but with no performance indicators to address the social licence measurement criteria, remain largely in the realm of academic discussion and consultancy practice (Bice 2014). However, in the realm of financing the mining industry, public equity funding, government, and society overall are much more aware of financial effects of mining, and particularly the post closure legacy associated with stabilizing and closing abandoned mines. This awareness has translated into a significant focus on the mining industry's closure performance and cost accounting, and this improvement has been strongly supported by financial law and the International Financial Reporting Standards (PWC 2007). In addition, the development of the ICMM's Sustainable Development Framework and Principles (ICMM 2003, 2008), and the MCA's Enduring Value Framework for Sustainable Development (MCA 2005), the GRI, and the Equator Principles has driven a renewed focus on mine closure as well. All of these initiatives call for more transparency in closure management and cost provisioning, with a desire for a better understanding of the true cost to the industry in relation to closure performance.

Under these sustainable development principles, initiatives, and financial reporting obligations, mining companies are required to self-regulate their compliance to these obligations for mine closure planning and associated cost estimates across all life cycle phases of their mining projects. Internal processes should be developed within mining companies to better understand their closure obligations and likely costs, and cost estimating processes are developed for long-term life of mine (asset) planning and budgeting, financial reporting for accounting provision purposes, and regulator reporting for environmental bonding.

Closure costs have to be considered over all closure planning, execution, and monitoring periods and include as a minimum:

- Operations – closure planning costs usually accounted for in operational budgets to include staff, research, investigations and analysis to inform and develop the site closure plan and undertake progressive rehabilitation activities;
- Transition to closure – usually the last 24 to 60 months of operations in which much of the detailed closure planning, preparation and implementation works are undertaken;

- Active (execution) closure – usually commencing when all operation and production activities cease and decommissioning, demolition, and rehabilitation works are undertaken; and
- Passive (post closure monitor and maintain) closure – usually considered as the post closure monitoring period leading up to the goal of final relinquishment of the mineral tenements. This may take up to 30 years and in some cases may never be achieved. It should be noted that there are limited examples of successful relinquishment of mineral tenements in Australia.

It is well understood that early recognition of closure costs promotes improved mitigation strategies for operations and encourages integration of closure into mine planning decisions, and to implement progressive closure and rehabilitation strategies that ultimately increase shareholder value by reducing the long-term liability during operations. A well-established closure planning and cost estimating process ensures investment, development, and operating decisions made today are made in full recognition of the potential financial impacts for closure in the future.

Life of Mine Closure Estimates

Typically, for life of asset (LoA) or life of mine (LoM) planning purposes, a mining company should develop a LoM closure cost estimate aligned with the life of mine plan. This closure cost estimate can be used internally within the organisation for asset valuation, business planning, and budgeting purposes and would include all costs required for any existing and future disturbance activities associated with the mining project as per the mine plan. The estimated cost can include liabilities and costs associated with both legal and non-legal obligations and commitments.

The LoM cost estimate must consider the total all up cost of closing, decommissioning, demolition, rehabilitation, and post closure monitoring of the project. Typically the costs allow for:

- All regulator and stakeholder obligations and commitments made to gain project approval and any additional and new obligations and commitments made during the operations with Mining Proposals, Mine Management Plans, Plan of Operations, Environmental Management Plans, and associated Environmental Authority (licence), Ministerial Approvals, captured;

- All company obligations to maintain management, ownership, and control of the site during the closure periods (transition to closure, active closure and passive closure periods) including safety, environmental, community, corporate, and site costs;
- Generally all costs associated with the management and operation of the site after the cessation of production including any care and maintenance costs, and/or any costs associated with any planned delay or deferral in undertaking active closure and rehabilitation activities; and
- All costs associated with maintaining in good standard all mineral tenements including regulator lease rents and local government rates.

In particular the following costs are to be **included** within the LoM cost estimate:

- All earthworks costs associated with rehabilitating all disturbed footprints including waste rock landform, tailings storage facilities, stockpiles, Run of Mine pads, all associated infrastructure footprints including processing plant sites, laboratories, reagent storage facilities, workshops, administration, stores, warehouse, camp, airstrips, lay downs, water containment facilities, drainage infrastructure, water supply facilities, pipelines, storage sheds, etc. Costs to be identified and included for maintenance and repair earthworks during the passive post closure period as the rehabilitated site stabilises;
- All decommissioning and demolition costs to dismantle and removal of all infrastructure off the site, and breakup and burial of demolition rubble, rubbish, and non-recyclable materials;
- All costs associated with contamination investigation, remediation, and or removal (if required) and reporting.
- All consultant costs associated with the active and passive post closure periods (Note: consultant costs required during operations should be excluded from the LoM estimate and accounted for and included in operating budgets as a part of the closure planning function of the mine owner);
- All mobilisation and demobilisation of equipment and personnel required during all closure periods;

- All project management costs including engineering, procurement, management and supervision, QA/QC, owners' costs, travel (Fly In Fly Out), and accommodation costs associated with each of the closure periods;
- All costs associated with any, and all, contracted services obligations such as power supply, contract agreements, land access and tenure agreements, and any other contractual commitments including stakeholder agreements and communications contracts, and supply contracts required during the various closure periods including fuel, general supplies, camp, and commute costs etc.;
- All inventory and asset disposal costs;
- All environmental licence monitoring and reporting obligations during the closure periods;
- All corporate costs including insurances, levies, equipment leasing payments, and overhead costs;
- All employee costs including salaries, wages and on-costs (workers compensation, payroll taxes, annual and long service leave obligations, severance and retrenchment obligations, superannuation obligations, etc.);
- All post closure monitoring costs including site access to undertake monitoring, measuring, and reporting, noncompliance investigations, stakeholder engagement, and legal costs as well as any residual risk management and provisioning costs; and
- Any contingencies that may be applied to any, and all of the costs.

The LoM estimate may include a salvage, resale, or scrap value for the plant and equipment of the project but this asset value cannot be included in any financial reporting, due to the legal requirement that does not allow “offsetting” a provision liability with an asset. The costs can be based on the works being completed by the mining company itself and/or a third party contractor and should represent a “best guess” estimation based on all knowledge, data, and information that is supporting the closure planning of the site. It represents the cost of the rehabilitation of the “at end of mine” disturbance footprint (including any planned expansion) and decommissioning of the mine infrastructure. This final footprint is often much larger than what is expected due to continued development of the mine during its life.

There are many other activities including investigations and studies that are best undertaken during the operating mine life to gain the knowledge, data, and information needed to inform and

develop the closure plan, enable successful execution of the plan, and demonstrate that any agreed closure goals and objectives can be achieved. These activity costs should be *included* within the LoM estimates, but *excluded* from any Financial Provision and Financial Assurance closure cost estimates, and must be included in annual operating budgets to ensure funding is available. These costs should account for closure planning staff and associated functional costs within the organisation, both corporate and at site, as well as any technical, scientific, and engineering studies undertaken to establish the context and detailed requirements for the closure of the site.

To test the proposed closure strategies for the various features of the mine site, allowances for scientific trials can be considered for inclusion within the LoM cost estimates, but excluded from all of the financial reporting closure cost estimates. These costs would include operating budgets for specific trials such as to test the proposed closure strategies for waste landforms or covers for tailings storage facilities. Where trials have not been undertaken prior to closure it can sometimes be difficult to reach agreement on closure goals and objectives without provision of evidence to support the proposed closure strategies. As a minimum, closure planning should at the least include funding for these investigations within operational budgets. These operational costs can be eligible for research and development tax benefits (in some countries) and should be managed accordingly.

Financial Provisions

The Mining Industry's mine closure Financial Provision accounting obligations are defined by International Financial Reporting Standards (IFRS 2007), and is the basis for much of the advice within this paper, and this generally represents statutory accounting and reporting requirements for public disclosure for the relevant legal jurisdiction in which the mining company operates. It is generally based on any legal obligation or compliance as a minimum, and represents a discounted cash flow estimation for the closure and rehabilitation costs of the current "On-The-Ground" disturbance footprint and decommissioning of the mine infrastructure at the time of reporting (usually annually) over the remaining life of the asset.

Financial liability estimates are required to comply with the regulations dictated by the generally accepted accounting principles of the reporting authority of the country in which the company operates and/or as per the listing requirements of the relevant country Securities and Exchange Commission (SEC) reporting. The estimate is filed with the relevant SEC as part of the

Company's annual report, generally as "Other Current Liabilities," "Environmental Liabilities", "Reclamation and Remediation Liabilities," and/or "Asset Retirement Obligations" (ARO). It is meant to accurately represent an accounting estimate of the end of year "On-The-Ground" liability appropriately distributed over the remaining life of the asset (the mine). Annual cash flows are used to calculate a single line item's net present value (NPV) of the liability in order to communicate this information to current and potential company shareholders through the annual report.

The LoM closure estimate can be used as the starting point for developing the financial provision estimate. The difference between the Financial Provision estimate and the LoM estimate is based on what is determined as a legal liability as at the end of the reporting year "On-The-Ground" disturbance versus what is not only on the ground at the end of the reporting year but also what is planned to be disturbed, constructed, and/or any expansion of the project planned for within the LOM mine plan. The definition of legal liability as well as the interpretation of the "On-The-Ground" liability can have a significant effect on liability estimates if not properly understood. The definition of "legal liability" should be reviewed to determine the inclusion or omission of specific LoM costs in the financial provision liability estimate. The end of year "On-The-Ground" liability is usually available and reported as a part of the annual environmental licence reporting requirements.

Generally the Financial Provision should include all direct costs included in the LoM estimate as they relate to the disturbance footprint at the time of reporting. In particular, the following costs should be *included* within the Financial Provision cost estimate (as per the statutory requirement of the jurisdiction in which the company operates and the IFRS 2007 requirements):

- All earthworks costs associated with rehabilitating all current "On-The-Ground" disturbed footprints including waste rock landforms, tailings storage facilities, stockpiles, Run of Mine pads, all associated infrastructure footprints including processing plant sites, laboratories, reagent storage facilities, workshops, administration, stores, warehouse, camp, airstrips, lay downs, water containment facilities, drainage infrastructure, water supply facilities, pipelines, storage sheds, etc. Costs should also be included for maintenance and repair earthworks during the passive closure period as the rehabilitated site stabilises;

- All decommissioning and demolition costs to dismantle and remove all infrastructure from the site, and breakup and burial of demolition rubble and rubbish;
- All mobilisation and demobilisation of equipment and all personnel required during all closure periods;
- All project management costs including engineering, procurement, management, and supervision, QA/QC, owners' costs, travel and accommodation costs associated with each of the closure periods; and
- All environmental monitoring and reporting obligations during the active and passive (post) closure periods.

The Financial Provision should *exclude* the following:

- Any “socio-economic” costs associated with stakeholders such as community consultations, social impact assessments, etc.;
- Any company employee entitlements that are accounted for in other balance sheet provisions such as annual and long service leave entitlements, and other costs associated with retrenchment and/or retraining and redeployment of employees. If third party contractors are to be used to undertake the closure works, then these costs will be included within the contractor rates used to estimate the financial provision;
- Any inventory and asset disposal costs;
- Any contingency costs, these are considered within the LoM cost estimate and should only be expensed against actual expenditure during the active and passive closure periods;
- Any salvage value returns are to be excluded (closure liabilities cannot be offset by an asset sale);
- All tenement holding costs - these are included in the LoM estimate and are generally considered as a corporate overhead cost;
- All corporate costs including insurances, levies, equipment leasing payments, and overhead costs;
- Any care and maintenance costs and/or any other costs associated with delaying or deferring the active or passive closure activities; and
- All closure planning costs (including staff costs) incurred during operations including any scientific research, studies, and investigations, engineering studies, and specific

investigative trials such as tailings and waste landform cover options. Much of this work will be eligible for research and development tax benefits (in some countries), and all these costs should be include in operational budgets during the mine life.

The Financial Provision cost estimate will generally be lower than the LoM closure cost, and the provision estimated cash flow is discounted over the remaining mine life to establish the balance sheet provision amount.

Regulator Financial Assurance (Environmental Bonding)

Environmental bonding or Financial Assurance closure estimates are generally required by the regulating authority in which the mine is located and estimated at the “start-up” approval for the project and based on the approved mine plan for the site. The estimate is used by that authority to determine the quantum of either bank guarantee, insurance bond, or cash required to be submitted to the regulating authority to ensure that if the mining company fails to meet its closure obligations, funds are available to the regulator to ensure closure and rehabilitation of the site can be undertaken. This estimate is generally calculated as per the regulating authority’s guidance and is often based on third party contractor rates to undertake the closure works for the current “On-The-Ground” disturbance footprint and decommissioning of the mine infrastructure. In essence, it is the estimated cost for the regulating authority to undertake the works to close and rehabilitate the mine if the company fails to meet its obligations under the approvals for the mine or abandons the project. This generally happens when the mine owner either goes into liquidation and or abandons the mine. The Financial Assurance cost estimate will be very similar in quantum to the financial provision estimate but often calculated based on the regulating authority’s cost formulation.

Conclusion

A structured and integrated closure planning process is an essential part of any mining company’s sustainability policy and financial reporting obligations. This requires an informed understanding of the closure and reclamation requirements for their mining projects and a disciplined and structured process for measuring, costing, and reporting these financial obligations. Three closure cost estimate processes have been outlined in detail for consideration to satisfy not only financial reporting requirements, but also for internal closure planning and budgeting processes and compliance for regulatory bonding and financial assurances.

Early recognition of all closure costs prepares operations to plan additional mitigation strategies and implement progressive closure and rehabilitation activities. Closure planning creates shareholder value if this long-term liability can be reduced or eliminated during operations. Well-established closure planning and closure cost estimating processes ensure investment, development, and operating decisions made today are made in full recognition of the potential financial impacts (positive and negative) for closure in the future.

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