

FINANCIAL CONCEPTS FOR MINE CLOSURE



About this document

This document has been prepared by the ICMM Closure Working Group for use by ICMM members and the wider industry to communicate and enhance the understanding of key financial concepts as they relate to mine closure. This document is intended to provide general conceptual guidance across a wide range of factual circumstances. The concepts and guidance in this document do not reflect the applicable standards, circumstances and legal requirements. Variations from this guidance may be needed in any particular circumstance. This document is not intended to define best practices within any particular jurisdiction or mining operation. Appendix A provides a summary of this document and the various types of closure costs and their application.

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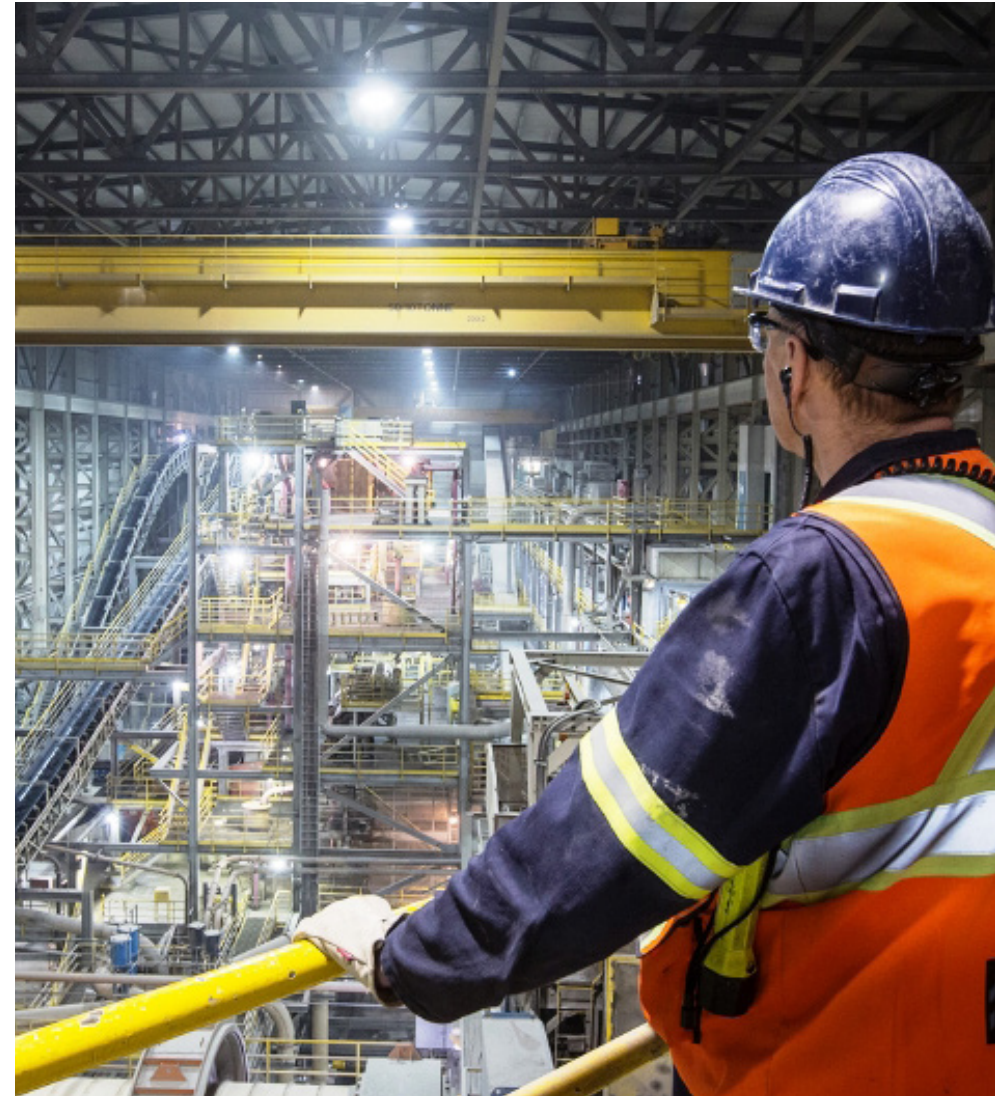
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Objectives

The purpose of this document is to enhance the understanding of key financial concepts as they relate to mine closure, enabling consistent communication of these concepts within relevant disciplines both internally and externally across the mining industry.

Key elements include:

- Define key terminology, including equivalent terms across major mining jurisdictions
- Applicable International Standards
- Enhance understanding of key concepts in mine closure accounting
- Provide an overview of the key mine closure cost estimate types



Useful definitions and terminology

Term	Definition
Closure	Actions planned for and implemented when a mine ceases operation or a portion of a mine (or mine facility) is permanently removed from use for mining purposes, including rehabilitation or reclamation, remediation, decommissioning, demolition and/or dismantling.
Life of Mine (LoM)	The length of time a mine is, or is planned to be, in production. Based on a mine plan developed in consideration of the available capital and the ore reserves or a reasonable and justifiable extension of the reserve estimate.
Life of Asset (LoA)	The length of time an asset (including but not limited to mine, processing facilities, refineries, smelters, rail, port, utilities, towns and associated infrastructure) is owned, operated and closed by the mining company up until divestment or relinquishment.
Rehabilitation	The return of land to a stable, productive and self-sustaining condition, after taking into account beneficial uses of the site and surrounding land. Reinstatement of degrees of ecosystems and function where restoration is not the objective.
Reclamation (commonly used in USA rather than rehabilitation)	Mine reclamation is the process of restoring land that has been mined to a natural or economically usable state.
Remediation	Remediation is the action of remedying something, in particular reversing or stopping environmental damage, often used in the context of contaminated soils or water. Remediation may include a number of activities carried out to clean up or mitigate contaminated land or water.

Term	Definition
Earthworks	The disturbance of soil or earth by any means including excavation (including subsurface), tunnelling, drilling, infilling, land rehabilitation or restoration, stockpiling, dumping of soil or sand, and the construction/reconstruction of any track, embankment, or drainage channel.
Post closure maintenance and management	Includes activities required to maintain and manage infrastructure and rehabilitation until relinquishment is possible, or on an ongoing basis if not.
Post closure monitoring	Includes monitoring after closure, including socio-economic, water quality, water quantity, terrain, ecological and air quality monitoring. Results are compared to success criteria.
Decommissioning	This is the process of taking infrastructure out of active service which begins at the end of its utility for site activities and ends with the removal of all unwanted infrastructure and services.
Decontamination	Removal of contaminants from buildings or other infrastructure. May involve activities such as asbestos abatement, pipeline cleaning and general cleaning/washing. Often required as preparation for recycling or reuse of assets.
Demolition/dismantling	This is the process of physically taking apart infrastructure and may involve disassembly of some or all of the structures, or destruction of infrastructure with heavy equipment or explosives.
Water management	Activities undertaken to manage water during and after closure, which may include: diversion, containment, extraction, irrigation, isolation, evaporation, mitigation and/or treatment.

Term	Definition
Sudden / unplanned closure	Occurs when a mining company halts operation activities due to economic conditions such as a sudden drop in commodity price, or operational hardship or mine owner going into liquidation.
Care and maintenance	Care and maintenance is used internally by the mine owner/operator to place a mine into a non production phase due to economic conditions or operational hardship.
Closure financial provision	Financial provision generally represents the public disclosure to support statutory accounting and reporting, is based on any legal liability or compliance as a minimum and represents a discounted cash flow estimation for the closure and rehabilitation costs of the current disturbed footprint and decommissioning of the mine infrastructure at the time of reporting (usually annually) over the remaining life of the asset. Also known as the Asset Retirement Obligation under IAS 37.
Financial assurance	Financial assurance means any financial instrument, including any surety bond, insurance policy, letter of credit, line of credit or other financial instrument or account, required by any governmental entity in an amount and form maintained by the mine owner related to or in connection with the conduct of the business or the activities of the mine, principally used to fund closure and rehabilitation of a mine site when the mine owner or operator is unwilling or unable to do so.
Net Present Value (NPV)	Net present value (NPV) is the difference between the present value of cash inflows and the present value of cash outflows over a period of time. Typically the mine closure provision will have a negative NPV due to costs of closure only being considered.
Probabilistic Estimation – Contingency	Probabilistic estimates are based on the requirement to produce a probability distribution (e.g. using Monte Carlo simulation) enabling estimate accuracy and various percentiles and mean value to be determined. It is often used where projects are outside the norm or have highly subjective inputs which introduce a significant inaccuracy in the outputs. Often used to determine a contingency within capital cost estimates and LoA mine closure cost estimates.

Term	Definition
Deterministic estimation – contingency	Deterministic estimates produce a single value for the estimate being undertaken e.g. contingency. The calculation parameters rely on the estimator's experience and historical information which make the method particularly useful for normal projects and less appropriate for projects outside the norm. It provides for a highly quantitative estimate but may be perceived as having less accuracy.
Confidence in the estimate	Measure of belief in the accuracy of the closure cost estimate. Often relates to risk and uncertainty associated with the costs to close and is usually applied through a contingency (probabilistic or deterministic) allowance to the cost estimate.
Accretion	In accounting, accretion expense is a periodic expense recognised when updating the present value of a balance sheet liability, which has arisen from a company's obligation to perform a duty in the future and is being measured by using a discounted cash flow approach. Used when expenses against the mine closure provision are undertaken in a current year and/or prior to the future obligation.
Obligation	An obligation is a course of action that someone is required to take, whether legal or moral. A liability is an obligation that a mining company has to another party, in most cases a government or regulating authority.
Environmental Remediation Obligation (ERO)	An environmental remediation obligation is an obligation to address the current or potential detrimental effects of existing environmental impacts due to mining activities and committing to environmental remediation activities such as spills of hazardous substances e.g. acid mine drainage or asbestos abatement.
Asset Retirement Obligations (ARO)	A liability for dismantling and removing an item or for restoring the site, is recorded when a present obligation exists. The liability is recorded at management's best estimate of the costs to be incurred. A pre-tax discount rate that reflects the current assessment of the risks specific to the liability is used to discount the liability. Also known as the financial provisional liability.

Term	Definition
Fair value	The estimated price at which an asset can be sold or a liability settled in an orderly transaction to a third party under current market conditions.
International Financial Reporting Standards (IFRS)	Common global accounting framework used by more than 100 countries around the world to standardise on financial reporting. International Accounting Standard (IAS) 37 is relevant for mining companies for their reporting of closure liabilities.
US GAAP	US Generally Accepted Accounting Principles (apply primarily within the US), similar standards to the IFRS framework.
Sarbanes Oxley Act 2002 (SOX)	The Sarbanes-Oxley Act of 2002 and also known as the Public Company Accounting Reform and Investor Protection Act and Corporate and Auditing Accountability, Responsibility, and Transparency Act and more commonly called Sarbanes-Oxley, Sarbox or SOX, is a US federal law that sets new or expanded requirements for all US public company boards, management and public accounting firms. Applies to all mining companies trading within the US.
International Accounting Standard 37 (IAS 37)	IAS 37 Provisions, Contingent liabilities and Contingent Assets Standard deals with the appropriate recognition criteria and measurement bases applied to provisions, contingent liabilities and contingent assets and requires that sufficient information is disclosed in the notes to the financial statements to enable users to understand their nature, timing and amount. The key principle established by the standard is that a provision should be recognised only when there is a liability i.e. a present obligation resulting from past events, e.g. exploration and mining activities.

Term	Definition
Provision (IAS 37 definition)	In financial accounting, a provision is an account which records a present liability of an entity. The liability may be of uncertain timing or amount.
Liability (IAS 37 definition)	Present obligation as a result of past events. Settlement is expected to result in an outflow of resources (payment).
Recognition of a Liability (IAS 37 definition)	An entity must recognise a provision if, and only if: <ul style="list-style-type: none"> • a present obligation (legal or constructive) has arisen as a result of a past event (the obligating event) • payment is probable (more likely than not) • the amount can be estimated reliably.
Measurement of Provisions (IAS 37 definition)	The amount recognised as a provision should be the best estimate (including risks and uncertainties) of the expenditure required to settle the present obligation at the balance sheet date. The provision is measured at a discounted present value using a pre-tax discount rate that reflects the current market assessments of the time value of money and the risks specific to the liability.
Discounting (IAS 37 definition)	The anticipated cash flows to settle an obligation are discounted using a pre-tax discount rate that reflects the current market assessments of the time value of money and the risks specific to the liability, if the effect is material.
Best estimate (IAS 37 definition)	The best estimate of the expenditures required to satisfy an obligation (liability) at the end of the reporting period and based on all reasonable knowledge and expectations at the time the estimate is undertaken. Should allow for any risks and uncertainties.

Key mine closure cost estimate types – high level summary

Closure cost estimate types	LoA (or LoM) cost estimate	Financial liability cost estimate	Sudden closure cost estimate	Regulator cost estimate (financial assurance)
	Costs that the operator expects to incur in the context of the current mine plan at the end of the mine life	Estimated liability based on applicable accounting requirements	Cost to close the operation in its current state	Costs that form the basis of a guarantee provided to a regulatory body
Closure and rehabilitation earthworks	✓	✓	✓	✓
Long term water management costs	✓	X*	X*	X*
Decommissioning, decontamination and demolition	✓	✓	✓	✓
Project (owners) management costs	✓	✓	✓	✓
Post closure monitoring and maintenance costs	✓	✓	✓	✓
Socio-economic costs	✓	X	✓	X
Employee retrenchment costs	✓	X	✓	X
Land holding costs	✓	X	✓	X
Contingency	✓	X	✓	X

* Included in the case of a constructive obligation

A: LIFE OF ASSET CLOSURE COST ESTIMATE





Life of Asset closure cost estimate

Overview

- Used to estimate the expected full cost to close a mine assuming that the site operates until the end of its currently planned mine life
- It is a forecast of total costs to meet all closure obligations that restore the mine site disturbed during all phases of the project life cycle
- It is used internally within the organisation for asset valuation, business planning, budgeting purposes and reported through management up to board level
- As this type of cost estimate assumes that the site will operate for its full planned mine life and is based on owner/operator costs of rehabilitation at the end of planned mine life, it normally is not used for public financial reporting or for regulatory purposes
- It is considered as the total cost of preparing for (planning, investigations and studies, research, trials and progressive rehabilitation) closure, decommissioning and demolition, rehabilitation, post closure monitoring and relinquishment (handover) to future land owner(s).

LoA closure costs should allow for:

- All regulator and stakeholder obligations and commitments made to gain approval of the project, any subsequent approvals and all additional and new obligations and commitments established during the mine life
- All company obligations to maintain management, ownership and control of the site during all closure periods (transition to closure, active (execution of) closure and passive (post) closure periods) including safety, environmental, community (internal employees and external stakeholders), corporate and site costs
- All costs associated with the management and operation of the site after the cessation of production including:
 - All costs associated with any planned, delayed or deferral in undertaking active closure and rehabilitation activities if included within the closure strategy
 - All costs associated with maintaining in good stead all mining project holding costs (e.g. mineral tenement fees, local government fees and taxes, insurances etc) including regulatory requirements (national and local).

The following costs should be included within the LoA cost estimate:

- Earthwork costs associated with rehabilitating all disturbed footprints and for maintenance and repair earthworks during the post closure period as the rehabilitated site stabilises
- Decommissioning, decontamination and demolition costs to dismantle, remove and dispose of all infrastructure off site
- Costs associated with performing studies needed to support closure planning, including remediation, reporting and water management
- Quality control and assurance costs
- Mobilisation and demobilisation of equipment and personnel required during all closure periods
- Project (owners) management costs for all closure periods including holding (monitoring) periods prior to handover to new land holder
- Costs associated with any and all contracted service obligations including supply contract agreements, land access and tenure agreements including mineral tenement fees, taxes and/or levies, any other contractual



commitments including stakeholder agreements, communications contracts, supply contracts required during the various closure periods including fuel and general supplies etc.

- Stores and supply inventory and asset disposal costs including return of consignment stock, draw down of liquids (fuel, reagents, etc.) and gases for the disposal and removal off site
- Environmental compliance monitoring and reporting obligations during the closure periods
- Corporate costs including insurances, levies, equipment leasing payments and overhead costs to support the closure periods
- All employee costs including salaries and wages and on-costs to undertake the works and general employee retrenchment obligations
- Any contingencies (estimation and risk) that may be applied to any and all of the costs and closure plan.

General considerations

- The LoA estimate may allow for a salvage (and scrap) value for plant and equipment (supported by third party quotes and evaluation) and all other assets depending on mine owner policy
- The costs can be based on the works being completed by the mining company itself and/or a third party contractor and is usually set by internal company guidelines and standards
- The costs should represent a best estimate based on all reasonable knowledge, data and information that is supporting the closure of the site at the time of estimation to produce an expected cost
- It represents the cost of the rehabilitation at the end of the mine life disturbance footprint (including any planned expansion).

Basis for calculation of the expected LoA cost estimate

- Calculated in today's (real) reporting currency
- Discounting and escalation / inflation can be applied to the closure cash flow to match other business planning standards used for budgeting and planning of the mine by the mine owner(s)
- Expected closure cost estimates may be calculated using factored rates, bottom up first principles estimation and/or contractor quotes depending on where the mine is within the mine life cycle
- Capital project cost estimating principles should apply and wherever possible the use of an experienced closure cost estimator is recommended.

Estimation Confidence

- Confidence in the cost estimate based on estimating accuracy and risk and uncertainty should be included in the LoA cost estimate using contingency allocations that:
 - Allow for the uncertainty of the scoped items within the closure plan
 - Allow for the known unknowns and represent a best estimate of the amount that is likely to be spent
 - Can use probabilistic or deterministic method to quantify the level of contingency to apply.

Reviewing and updating LoA cost estimates

- Update the cost estimates aligned with:
 - LoM plan updates set by company guidelines
 - Closure plan updates required by regulators.
- LoA cost estimate to be supported by:
 - LoM plan
 - Closure Plan
 - Basis of Estimate Report.



**B: FINANCIAL
LIABILITY
CLOSURE COST
ESTIMATE**



Financial liability closure cost estimate

Overview

- Is used for financial (including tax) accounting purposes and is normally not used for regulatory cost estimates or financial assurance
- Is required under financial liability accounting obligations and reporting principles
- Is reported through management up to board level and financial auditors prior to public disclosure
- Represents the public disclosure to support accounting and reporting requirements as defined by the mine owner's relevant financial reporting standard and based on any legal obligation, liability or compliance as a minimum
- Represents a Net Present Value (NPV) estimation for the closure and rehabilitation costs of the current disturbed footprint and decommissioning of the mine infrastructure at the time of reporting (usually annually)
- Represents the amount that a company would reasonably and rationally pay to settle the obligation (liability) on the reporting date or to transfer to a third party.

How is the liability carried on the mine owner(s) financial balance sheet in their annual report?

Reported as either:

- Mine Closure Provision
- Other Current Liability
- Environmental Liability
- Reclamation and Remediation Liability
- Asset Retirement Obligation (ARO).

Discount rates (percentage) varies depending on company policy (applied to most financial obligations)

- Weighted average cost of capital percentage (lending rate) is often used
- Risk free discount rate can be used where risk costs are included in the expected closure cost estimate
- Country risk allocation may also be included within the discount rate.

The following costs should be included within the financial liability closure cost estimate:

- All regulator and stakeholder obligations and commitments including estoppel (constructive obligations) commitments made to gain approval of the project
- All direct closure execution costs included in the LoA estimate as they relate to the disturbed footprint at the time of reporting
- Earthworks costs associated with rehabilitating all current disturbed footprints
- Decommissioning, decontamination and demolition costs for dismantling and removal and disposal of all infrastructure off the site
- Costs associated with performing studies needed to support closure planning, including remediation, reporting and water management
- Quality control and assurance costs
- Mobilisation and demobilisation of equipment and personnel required during all closure periods
- Project (owners) management costs including any execution costs associated with third parties or engineering, procurement or construction management (EPCM)

B

- Environmental compliance monitoring and reporting obligations during the closure periods
- Any social constructive obligations included in any public Environmental Impact Assessment (EIA), closure plans, operations plans and/or public commitments made by the company (ICMM principles, policy statements etc)

The following costs should be excluded from the financial liability closure cost estimate:

- Any socio-economic costs associated with stakeholders such as community consultations, social impact assessments etc unless specific obligations and commitments have been made
- Any company workforce/employee entitlements (unless promissory estoppel commitments have been made)
- Any inventory and asset disposal costs and termination of supply agreements usually considered as operational agreements
- Any contingency allocations unless mine owner/industry/international accounting standards and/or specific obligations and commitments have been made regarding inclusion of uncertainty and risk contingency allocations

- Any salvage or scrap value returns are to be excluded (closure liabilities cannot be offset by an asset sale)
- All tenement holding costs unless mine owner accounting standards require them to be included
- 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
- All closure planning costs (including staff costs) incurred during operations unless mine owner accounting standards require these to be included

General considerations

- Confidence in the financial liability cost estimate based on risk and uncertainty can be allowed for with the discount rate or as required by the mine owner's accounting standards
- The costs can be based on the works being completed by the mining company itself and/or a third party contractor and usually set by internal and/or external guidelines and standards
- Update of the expected closure cost estimate is generally aligned with annual financial reporting requirements
- Financial liability cost estimate reporting to be supported by:
 - LOM mine and closure plans
 - Basis of estimate report
 - Financial (external) audit report and sign off by executive management and board



**C: SUDDEN
CLOSURE
COST
ESTIMATE**



Sudden closure cost estimate

Overview

- Used for internal planning purposes to evaluate business risk response to unforeseen changes in the physical, political, social or economic conditions (e.g. sudden commodity price drop)
- It is an estimate of the costs to close the mine tomorrow
- It is used internally within the organisation for options analysis, business planning and decision making purposes and reported through management up to board level
- The sudden closure cost estimate is not normally applicable to or used for regulatory purposes, although some jurisdictions may require a regulators cost estimate to be based upon assumed unplanned closure at a particular point in time that may not be at the end of mine life

The following costs should be included within the sudden closure cost estimate:

- All costs to rehabilitate, decommission and close the operation in its current state
- All workforce/employee entitlements and retrenchment costs
- All costs incurred post closure including monitoring, maintenance, ongoing fees, taxes and human resources costs, land holding costs, water management etc.
- All costs incurred due to early termination of supply contracts and agreements and any regulatory compliance requirements
- All costs associated with the management and operation of the site after the cessation of production including any care and maintenance costs and/or costs associated with any planned delay or deferral in undertaking active closure and rehabilitation activities.

Basis for calculation for sudden closure cost estimate

- Calculated in compliance with appropriate internal business planning standards and guidelines
- Calculated in today's reporting currency to match other business planning standards used for budgeting and planning of the mine
- The costs should represent a 'best estimate' based on all reasonable knowledge, data and information that is supporting the sudden closure of the site at the time of estimation to produce an expected cost
- Generally calculated based on a 'bottom up first principles' estimation basis for either owner operations or third party contractors undertaking the works.

**D: REGULATORS
CLOSURE
COST ESTIMATE
(FINANCIAL
ASSURANCE)**





Regulators closure cost estimate (financial assurance)

Overview

- Regulatory closure costs estimates are those required by law to be included in financial assurance against sudden/unplanned closure
- The regulator closure cost estimate is used by the regulator to establish a financial assurance, bond, bank guarantee or other financial mechanism as required by the regulation in place at the time
- Generally the regulator closure cost estimate is calculated at all phases of the mine life cycle from exploration activities through to full operations
- The regulator closure cost estimate will be different to the LOA closure cost estimate, the financial liability closure cost estimate, the financial liability closure cost estimate and the sudden closure cost estimate due to the applicable laws and rules and different purposes of these other cost estimates
- What is included within the regulator closure cost estimate is dependant on the regulatory requirements within that jurisdiction
- Usually based on a third party earthworks contractor undertaking the works

- The following costs are generally allowed for within regulatory closure cost estimates:
 - All costs to rehabilitate, decommission and close the operation in its current state
 - The estimate may allow for post closure monitoring and maintenance, project (regulators) management costs and contingencies which may be based on a fixed % of the total estimated bond amount
 - Depending upon applicable regulatory requirements, typically excludes tenement holding costs, workforce retrenchment, community and other social costs, salvage and scrap value.

General considerations

- The regulator closure cost estimate is used to determine the required amount of financial assurance to be covered by a financial assurance mechanism
- Allowable financial assurance mechanisms are defined by the applicable legal requirements and may include:
 - Self-assurance or guarantee based upon meeting specific financial tests
 - A third-party guarantee (e.g. parent company, associated company or bank guarantee)
 - A letter of credit

- Government bond
- Investment trust fund
- Insurance policy
- Cash deposit in combination with other mechanisms
- Regulator closure estimates are established using various methods depending on the regulating authority method
 - Regulator calculators e.g. Nevada's Standardised Reclamation Cost Estimator (SRCE)
 - Online Excel spreadsheet calculators e.g. Queensland, NSW, SA and Victoria in Australia
 - Mine owner established estimates based on their LoA and financial provision estimates.
- Regulator closure cost estimates may be updated periodically or as mine plans and approvals change depending on the regulatory requirements
- The financial mechanism established is generally cancelled and/or reverted back to the mine owner once all closure and rehabilitation works have been completed and have satisfied the regulators agreed closure criteria
- Some jurisdictions require a residual risk closure cost to be estimated and financial mechanism established to allow for any future remediation and repairs that may arise once the mine has been relinquished.



PROGRESSIVE REHABILITATION

Progressive rehabilitation

Progressive rehabilitation is ongoing rehabilitation activities during the operational phase of the mine prior to cessation of operations

- Integrated mine closure planning allows progressive rehabilitation to be planned for, scheduled and implemented as a part of mining operations
- Generally the costs for progressive rehabilitation are included within mine operations cash flow expenditure, included within the LoA and closure provision cost estimates and may be expensed against the closure provision
- The cost may also be included within the financial liability (closure provisions)
- Mechanisms for managing the expenditure against the provision will be required and include:
 - Formal internal expenditure approval processes
 - Costs accretions to account for earlier than expected expenditure against the balance sheet (discounted) provision amounts.





FAIR VALUE (MERGERS AND ACQUISITIONS) TREATMENT

Fair value (mergers and acquisitions) treatment



It is generally accepted that all closure cost estimates (LoA and provision) and the regulators closure cost estimates are made available for fair value assessment

- The closure provision (balance sheet liability) is generally accepted as fair value recognition of the closure liability while ensuring that:
 - Supporting closure plan is provided
 - Discount and escalation rates are provided
 - Due diligence requirements include the ability to review and evaluate all supporting data and information to the liability
 - Due diligence teams have relevant expertise and undertake site inspections.

Appendix A: Key elements of cost estimate types

Summary table

Key elements	A: Life of Asset closure cost estimate	B: Financial liability cost estimate	C: Sudden closure cost estimate	D: Regulator closure cost estimate
Overview	<p>Costs that the operator expects to incur in the context of the current mine plan at the end of the mine life.</p> <p>Current disturbance and liability (ARO/PER) + future disturbance and liability (future mine plan) + non-legal costs (severance, insurance, property holding etc).</p> <p>As this type of cost estimate assumes that the site will operate for its full planned mine life and is based on owner/operator costs of rehabilitation at the end of planned mine life, it normally is not used for public financial reporting or for regulatory purposes.</p>	<p>Estimated liability based on applicable accounting requirements.</p> <p>Current disturbance and liability (ARO/PER) under US GAAP or IFRS (legal only and for mine closure and reclamation obligations).</p> <p>The financial liability closure cost estimate is used for financial (including tax) accounting purposes and is normally not used for regulatory cost estimates or financial assurance.</p>	<p>Cost to close the operation in its current state.</p> <p>Current disturbance and liability (ARO/PER) + non-legal costs (severance, insurance, property holding etc).</p> <p>The sudden closure cost estimate is not normally applicable to or used for regulatory purposes, although some jurisdictions may require a regulators cost estimate to be based upon assumed unplanned closure at a particular point in time that may not be at the end of mine life.</p>	<p>Costs that form the basis of a guarantee provided to a regulatory body based on an approved closure plan.</p> <p>As per regulatory requirements that may include additional contingencies or conservative assumptions beyond the expected cost. These can also be goal oriented (e.g. slopes must be stable) rather than prescriptive (e.g. slopes must have a 3:1 horizontal to vertical ratio).</p> <p>The regulator closure cost estimate will be different to the LoA closure cost estimates, the financial liability closure cost estimate and the sudden closure cost estimate due to the applicable laws and rules and the different purposes of these other cost estimates.</p>
Use	Used internally in asset valuation, business planning, closure planning, project economic evaluation, budgeting, cost tracking etc. Also used by some companies for provisioning funds for closure. The cost estimate should be based on the mine closure plan.	Used externally for financial reporting, used internally by some companies for provisioning or liability estimates.	Internally – occasionally externally (upon request by regulators).	Externally – regulators require a financial safeguard against closure liability should a company be unable to meet its obligations (e.g. due to bankruptcy, mine abandonment etc).

Key elements	A: Life of Asset closure cost estimate	B: Financial liability cost estimate	C: Sudden closure cost estimate	D: Regulator closure cost estimate
Audience	Company boards, internal investment committee, executive management, site management and site accountants.	Company board, company financial auditors, executive management, site management, external shareholders and regulators.	Company boards, executive management, site management, corporate and site business risk teams and accountants (primarily).	Jurisdictional regulators and parties providing financial assurance via surety bonds or other instruments. Often made publicly available in company financial reports, by regulators and / or in line with regulatory requirements.
General inclusions	Based on predicted impact over the entire LoA, including the entire footprint of disturbance (i.e. existing and future disturbance) and complete social and workforce impact. It includes liabilities associated with any and all legal and non-legal obligations, project management costs, post-closure monitoring and maintenance costs and is based on the current mine closure plan. It should also include any land holding costs and progressive rehabilitation costs (even if the cost is included within the operations budgets) and allows for contingencies (estimation and/or risk). Depending on class of estimation, it should include 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.	Based upon current disturbed footprint. Includes restoration for the existing disturbance and current legal obligations for site restoration, the re-establishment of flora and fauna and the decommissioning of mine related infrastructure. Provision includes estoppel commitments / constructive obligations – beyond legal requirements (i.e. where the company has made a commitment that someone can be reasonably expected to rely upon). It should allow for any legal liability or compliance as a minimum.	To rehabilitate, decommission and close the operation in its current state – should it close tomorrow. Also includes the costs incurred post closure including monitoring, maintenance, ongoing fees, taxes and human resource costs, land holding costs etc. Should include early termination of supply contracts and any regulatory compliance requirements.	Depends on regulatory requirements whether limited to current disturbance or full LoA planned or approved disturbance. Often (but not always) limited to physical damage, i.e. decommissioning, demolition, rehabilitation, remediation works. Long term water management, residual impacts, post closure monitoring and maintenance.

Key elements	A: Life of Asset closure cost estimate	B: Financial liability cost estimate	C: Sudden closure cost estimate	D: Regulator closure cost estimate
General exclusions	Can include salvage value.	<p>Depending on reporting standard used and company interpretation of standard – generally excludes workforce retrenchments, social closure aspects, closure planning costs, corporate costs (i.e. insurances, levies, equipment leasing payments), tenement holding costs, inventory and asset disposal costs and non-legal obligations (with the exception of promissory estoppel / constructive obligations).</p> <p>Also excludes owner’s management costs (unless required to fulfil a commitment under FAS143 or the equivalent IFRS management costs) and contingent liabilities.</p> <p>Excludes any salvage value or scrap resale (generally not permitted to offset a liability with an asset under financial reporting rules).</p>	Only salvage value and scrap resale to be excluded, all other costs to be included as far as possible.	<p>Depending upon applicable regulatory requirements, typically excludes tenement holding costs, workforce retrenchment, community and other social costs, salvage and scrap value.</p> <p>Quality assurance requirements increase as site approaches end of life (closure).</p> <p>Will often include a fixed percentage cost for project management and contingencies.</p>
Financial treatment	Calculated in today’s (real) reporting currency, can be discounted and escalation / inflation can be applied to match other business planning standards used for budgeting and planning of the operations.	Calculated in compliance with appropriate financial reporting standards. A key input into financial provisioning calculations. Usually represents a discounted cash flow estimation for the closure and rehabilitation costs of the current disturbed footprint to date and decommissioning of the mine infrastructure.	Calculated similar to LoA cost estimates. Used for internal planning and response to unforeseen changes in the physical, political, social or economic conditions (e.g. sudden commodity price drop).	Often regulatory specific and range from set values per disturbance type, specific calculators or acceptance of company estimates. Estimate used to establish a third party (e.g. bank) guarantee, letter of credit, bond, insurance policy and / or cash deposit. Can also be used to establish an annual levy payment into fund for regulator expenditure on abandoned mines programs (Australia).

Key elements	A: Life of Asset closure cost estimate	B: Financial liability cost estimate	C: Sudden closure cost estimate	D: Regulator closure cost estimate
Applicable guidelines and estimate method	Best estimate based on current knowledge, mitigating technology and current mine closure plan. Should align with industry and company guidelines and standards.	Often calculated in compliance with appropriate financial standard being used to determine the liability cost estimate. This may include the USA GAAP, IFRS and any other standards established in the reporting jurisdiction as well as company internal reporting requirements and standards.	Same as for LoA.	Calculations are compliant with relevant regulations and regulator estimating tools, e.g. Nevada Standardized Reclamation Cost Estimator (SRCE), the Wyoming Department of Environmental Quality Guideline 12 and calculators in Australia. Mechanism dependent on regulatory requirements – may be cash, bank guarantee, insurance, trusts or a combination of these.
Cost basis (e.g. first or third-party costing)	Can be estimated based on third party contractors undertaking the closure works or company (owner operations) conducting the closure works. Usually set by internal company guidelines and standards. Can be undertaken using bottom up first principles estimation or contractor quotes depending on how close to closure the operation is. Capital estimating principles should apply for concept study, scoping study, pre-feasibility, feasibility and execution costing levels depending on how far away from closure the operation is.	Depends on standard – third party contractor costs generally used (sometimes owner costs are used with a 10-15% oncost). These estimates may also be supported by bids, historic spending support, industry references and professional judgement.	Like LoA closure cost estimates, either third party or owner operations. Usually set by company guidelines and standards.	Financial assurance is usually calculated on the basis of work being undertaken by a third-party contractor, operating under a State managed process for bidding and project oversight.

Key elements	A: Life of Asset closure cost estimate	B: Financial liability cost estimate	C: Sudden closure cost estimate	D: Regulator closure cost estimate
Degree of confidence	<p>Confidence in cost estimate increases over time as knowledge and information become known, studies are undertaken to inform the closure planning process and the understanding of actual vs predicted impacts improves, closure vision is established, end land uses are understood and completion criteria become clear.</p> <p>Any degree of uncertainty is accounted for in the contingency which may be estimated based on probabilistic and/or deterministic methods. Risk contingency should also be considered.</p>	<p>As per LoA requirements except that contingency is usually not included unless a limited cost overrun to account for matters such as expected weather or equipment breakdown delays are considered probable.</p>	<p>As per LoA, with focus on risk contingencies.</p>	<p>Depends on the regulator's method of calculation.</p> <p>A conservative contingency allowance (percentage factor) is often included within the calculation tool.</p>
Update requirements	<p>Should be updated as the business and mine plan for the operation changes, as additional cost, technology and impact information becomes available and should align with any updates to the site closure plan (set by company guidelines and standards).</p>	<p>Updated annually as per company's public financial reporting requirements to include inflation and formal updates i.e. increase in footprint areas, material change in the mine plan, methodology for rehabilitation etc. The estimate will be audited by third parties.</p>	<p>Generally aligns with the LoA cost estimate requirements but should be undertaken on an annual basis when economic conditions are poor for the commodity being mined.</p>	<p>Depends on regulatory requirements. Often updated annually or when additional mining approvals are sought and approved. The amount can be reduced/increased in line with progressive closure works or when the mine plan and/or the mine closure plan is revised.</p>
Critical success factors	<p>Critical assumptions and basis for costs are clearly defined to inform future updates. A Bases of Estimate report (BoE) should be prepared that will describe how the estimate was prepared, outline all sources of data (e.g. rates, volumes, quantities, technical closure data etc), summarises the estimate costs and presents the relevant assumptions and criteria used to develop the estimate.</p>	<p>Critical assumptions and basis for costs estimates are clearly defined to inform future updates. Supported with a BoE report and relevant mine closure plan that is made available to auditors (may not be reported externally to shareholders and other third parties). Estimates should be supported by current conditions in the field regardless of the timing of the most recent regulator closure cost estimate update.</p>	<p>Aligns with the LoA cost estimate but will include implementation strategy in more detail.</p>	<p>Depends on regulatory requirements but will need to be supported with the closure plan.</p>

Key elements	A: Life of Asset closure cost estimate	B: Financial liability cost estimate	C: Sudden closure cost estimate	D: Regulator closure cost estimate
Alternative terminology	Life of Mine (LoM), closure cost estimate.	Asset retirement obligation (ARO), Provision for Environmental Remediation (PER), current closure liability, reclamation liability, decommissioning and rehabilitation liability, restoration liability, remediation liability, IFRS liability, closure provision, closure and post-closure care estimates.	Unplanned / immediate closure costs.	Mine rehabilitation bonds, financial guarantee, Rehabilitation Cost Estimate (RCE), financial assurance estimate.
Important to understand	Used for strategical business planning and scenario analysis. Also used to understand the risks and opportunities for preparing for closure.	Used by companies to report their financial liabilities as per the required standards applied. Some reclamation actions such as the movement of overburden and its placement as cover material, can be undertaken as part of normal operations and are therefore considered an operational expense. A sudden and unplanned closure can cause these costs to be reassigned to an ARO cost.		Financial assurance money is often not available for the conducting of closure works; it is refunded after the works have been completed and signed off by regulators, creating a risk of paying twice. Depending on the regulator method, total financial assurance sums can vary significantly from other closure cost estimations.
Disclosure Obligations	Will be required for sale of asset due diligence. No specific disclosure requirements.	Environmental remediation is very specific especially for publicly listed companies. Requirements may be quite different for private ownership of the asset. Disclosure requirements are defined by IAS 37.	As per LoA requirements.	Relinquishment and the types of financial instruments – different requirements of long-term treatment (US).

© **ICMM**

35/38 Portman Square

London W1H 6LR

United Kingdom

+44 (0)20 7467 5071

info@icmm.com