



IGF

INTERGOVERNMENTAL FORUM
on Mining, Minerals, Metals and
Sustainable Development

IGF CASE STUDY

Mine Closure Policies in South America

Secretariat hosted by



Secretariat funded by





INTRODUCTION

A mine's life is often viewed in terms of a cycle, starting with mine planning (exploration, pre-feasibility studies) then transitioning into the construction and operational stages, and ending with the closure and post-closure stages whereby the mine site eventually has a new land use. Closure planning is actively taking place throughout each of these stages, from a more conceptual level in the early stages of the mining project to more detailed planning and progressive closure implementation during operations. It is essential that mine closure planning occurs in conjunction with mine planning and that decisions in the early stages are made with the end in mind. This concept is in line with accepted sustainable development principles.

BEST PRACTICES IN MINING POLICY

Successful mine closure policy requires early planning, consistent application (and enforcement) of legal requirements, adequate financial assurance through all stages of the mine life, and clear conditions for relinquishment or management of residual human and/or environmental risks. The following section provides a summary of current best practices.

MINE CLOSURE PLANS

A basic feature of good mine closure policy is the requirement for a mine closure plan to be regularly submitted to the regulator. The closure plan should be initiated before the start

of mining operations, tailored to address site-specific conditions and risks, and provide clear documentation of plans, progress, and learnings to date.

Closure plans should, at minimum, address the following topics:

- Authorization (corporate endorsement)
- Executive summary
- Scope and purpose
- Project context
- Project overview
- Stakeholder engagement
- Closure obligations
- Temporary or unforeseen closure
- Post-closure land use
- Identification and management of closure
- Risks
- Closure monitoring and maintenance
- Financial assurance
- Data management
- References

This case study underscores the fact that the financial assurance element is key: it must be designed to ensure that sufficient funds will be in place to implement the closure activities outlined in the closure plan. Globally, the existence of a mechanism to ensure that adequate funds are available at the end of mine



life (planned or unplanned) is now considered fundamental to effective mine closure policy. Much of current mine closure practice and regulation has been developed to avoid the generation of abandoned mine sites or inadequately funded closure liabilities.

FINANCIAL ASSURANCE

Liability associated with abandoned mines has historically been absorbed by the public through the appropriate level of government. To avoid this, financial assurance provides a mechanism to ensure funds are available to cover the costs of mine closure.

The purpose of financial assurance is to ensure that sufficient funding is available for a third party to reclaim and close the mine in the case that the operator is unable or unwilling to complete the work. The cost to close a mine will vary over the course of its life, as does revenue from mining operations. As such, the policy around financial assurance must strike a balance between attracting investment and protection of the public interest. A third-party audit of the financial assurance calculation is common, particularly where the regulator lacks sufficient capacity to complete this work.

Many mining regions require proponents of new mines to post financial assurance in some amount and form prior to receiving approval for the mine. Over the construction and operational phases of the mine life, the amount of financial assurance will be adjusted such that it corresponds to the work required to reclaim and close the site: the amount can be correlated to remaining operational mining years or to mine closure plan updates/expected land disturbance. Theoretically, the ideal financial assurance accurately represents the cost to close and reclaim the mine at every stage of the mine life, growing as the level of disturbance and liability grows, and shrinking as closure activities and reclamation take place.

Progressive reclamation can therefore reduce the financial assurance required during the mine life, although it should be recognized

that significant progressive reclamation is not always feasible. Financial assurance covers the cost of closure work during the active closure phase as well as during post-closure monitoring and maintenance. Financial assurance for each stage can be provided individually or as one joint amount. In an ideal scenario, when all closure measures have been completed and it is demonstrated that no ongoing monitoring or maintenance is required, the remaining amount of financial assurance is returned to the mining proponent. This scenario remains rare in current practice, and some degree of ongoing monitoring and maintenance is often needed for larger sites.

Financial assurance calculation requires that clearly defined rules be established by the regulator. Care needs to be taken that the mechanism by which financial assurance is calculated and administered is fair, accurate, and transparent. A balanced and transparent administration of financial assurance is critical to ensuring a fair competitive environment between companies. Accurate financial assurance estimates protect the interests of the state, ensuring that sufficient funds are in place to carry out closure if needed. They also protect the interests of the mining companies, ensuring that they are not required to put in place financial assurance amounts that are disproportionate to the impact they have actually had at any stage of mine development.

As part of financial assurance policy, some jurisdictions require costs to be calculated using a specific spreadsheet or model. While this can be attractive for ease of evaluation and providing a seemingly standardized and fair approach to costing, it is difficult for spreadsheets to capture the true variability between sites.

Standardized spreadsheets are especially less suitable as part of detailed designs and cost estimates developed closer to the date of closure.

An important factor addressed in different ways around the world is the discount rates used in calculations of closure costs. As closure costs



are often expected to be incurred in the future, the discount rate selected can have a material impact on the amount of financial assurance required. Specifying discount rates based on a transparent and public metric is generally a fairer practice than negotiating discount rates on an individual project basis.

For financial provisions, it is an almost universally accepted practice that the financial provision amount be regularly updated. This may be on a predetermined schedule and may also be tied to major changes in the mine plan.

While the form in which financial assurance is provided varies across jurisdictions, some forms are more common than others. These include irrevocable bank guarantees, insurance bonds, and renewable letters of credit. However, this can also include less-common forms such as cash deposits in combination with other forms, trust funds, collateral unrelated to the mine, insurance policies, parent company guarantees, balance sheet tests, and financial strength ratings.

Two of the most relevant documents on financial assurance are the International Council on Mining and Metals' (ICMM) *Financial Concepts for Mine Closure* (2019) and *Financial Assurance for Mine Closure and Reclamation* (2005). The first document provides a current high-level overview of financial assurance practices, similar to that found in their *Integrated Mine Closure – Good Practice Guide* (2018). ICMM (2005), while now 15 years old, still provides one of the most detailed breakdowns of the financial instruments available for financial assurance and is still broadly applicable.

POST-CLOSURE LAND USE

Post-closure land use is the element of closure planning and implementation that will be most visible to the public and is typically a component of sustainable development. Progressive closure policy promotes early identification of a post-closure land use, such that it can be worked toward throughout the mine life. In many cases, the optimum post-closure land use will be a mosaic of multiple complementary land

uses over the mine site. Further, the vision for post-closure land use is usually best refined iteratively over the course of operations.

These refinements incorporate the results of engagement with various stakeholders, including local communities and the mining company, and may result in an evolution of the vision for post-closure land use over the life of the project.

TECHNICAL GOALS

A realistic and defensible technical foundation allows for the closure plan to be implemented with minimal adverse environmental and human health effects. With respect to policy, a framework should exist to review and evaluate the technical aspects of closure plans so that they can be approved or returned with additional information requests to the proponent. Reviewers can be government officials where sufficient capacity has been developed in the wide range of topics addressed in the plan, or external reviewers can be used to assess all or part of the plan. In the latter case, a mechanism for funding the external (expert) review is required.

The role of the technical review is critical in the assessment of financial assurance. The amount of financial assurance put in place for a project can only be considered adequate if it has been calculated based on adequate technical measures. Adequate technical measures are those that can be reliably expected to achieve technical goals.

CLIMATE CHANGE

The design lives of mine closure systems and components vary, but they tend to be on the order of hundreds to over thousands of years. Given these timeframes, climate change is a rational and responsible consideration.

Climate change has affected precipitation and temperature patterns globally, with subsequent alterations to surface and groundwater systems, glacier and permafrost coverage, vegetation patterns, and ecosystem dynamics. Given the present uncertainty in the extent of changes, an understanding of the range of potential future



conditions is beneficial in planning and design for closure. Some aspects of the post-mining landscape may be more susceptible to climate changes than others (i.e., future landforms may be subject to longer periods of drought, followed by higher-intensity floods than they are at present); high-risk features throughout the site should be identified early in mine planning stages and designed for closure accordingly.

Adequate financial provisions for closure require that climate change effects have been considered in a way that is sufficient for the closure measures designed. Consideration of climate change effects may alter the requirements for post-closure maintenance, design criteria, or the risk profile of post-closure landforms or infrastructure.

SOCIO-ECONOMICS

During mining operations, local (and sometimes regional) communities can develop a dependency on the mine for employment and other benefits such as electricity and municipal works, education, health care, etc. Where the economic foundations of a community are not diversified outside of the mine, closure can have a detrimental impact that can extend into the region and over decades into the future. Mine closure policy can mitigate against negative socio-economic outcomes by ensuring that effective stakeholder engagement takes place early in the mine planning process and continues throughout the mine's life. While global mine closure practices and corporate social responsibility commitments are increasingly concerned with managing the transition from mining to post-mining economies, the necessary effort for this transition management is not typically considered as part of financial assurance requirements.

CLOSURE MONITORING AND MAINTENANCE

Throughout closure, including progressive reclamation, closure, and post closure, monitoring and maintenance of the mine site are required to adaptively tailor the reclamation methods used and monitor the results achieved.

Monitoring tracks the trajectory achieved and allows for an evaluation of the effectiveness of closure activities. Throughout the mine life, closure works should be evaluated with reference to agreed-upon closure targets and timelines, such that changes can be made where necessary to achieve the desired outcomes. Post-closure policy needs to address monitoring and maintenance timelines realistically, as delayed or prolonged risks may exist.

Provision for sufficient post-closure monitoring and maintenance is required until a time when all closure criteria have been achieved. Financial assurance provisions for closure should consider a realistic duration of the post-closure monitoring and maintenance period.

MINE CLOSURE LEGISLATION IN CHILE AND PERU

Governments in Latin America have been transitioning from relying on mining corporations to follow international best practices toward developing national legislation surrounding mine closure to ensure appropriate closure is planned for and undertaken. Across the region, there are many countries where legislative expectations around mine closure are established through environmental and social impact assessments (ESIAs) for new mining projects, either directly through legislation or through legally binding commitments made during the ESIA process. While this approach does provide a legally binding framework for mining companies to define and commit to closure measures, it leaves several significant gaps.

Based on historical precedents, one of the most important gaps is that legal commitments adopted through an ESIA process do not provide the state with any protection against inheriting the financial liabilities for closing the site in the case of a bankruptcy or in the case of other events where the company is unwilling or unable to pay for the cost of closure. A government that has no practical mechanism to force payment of closure costs is then left with a significant liability—and potentially a significant hazard to



the environment, human health, and/or public safety. Financial assurance is the practical and increasingly common mechanism to ensure that governments are not left with unfunded liabilities associated with mining operations.

In Latin America, to date only two countries have established comprehensive, national mine closure legislation that requires mining operations to provide financial assurance for closure liabilities. The approach in both countries shares many important commonalities, including:

- Clear, specific legislation for mine closure that specifically defines the requirements for financial assurance.
- Transparency around key aspects of how financial assurance is to be estimated, including defined methodologies for establishing discount rates.
- A requirement for closure cost estimates to be provided together with a closure plan, with both to be reviewed for adequacy by a national authority that has the authority to reject the plan or request modifications.
- A requirement for regular updates to both the plan and financial assurance estimate.
- National guidance documents that, while not legally binding, provide clear guidance with respect to the expected contents of closure plans, including expectations around establishing adequate physical and chemical stability through the closure works.
- National guidance documents that indicate how the financial assurance amount is to be calculated, presented, and constituted, including direction on the acceptable financial instruments.

While there are many differences in the mine closure legislation and guidance in Chile and Peru, both can be broadly said to be aligned with the most important aspects of internationally accepted best practice, and in some areas can be seen as leading the practice globally. However, neither countries' legislation places

significant emphasis on the social aspects of mine closure, nor on land use post-mining.

In both Chile and Peru, the oversight of mine closure occurs largely at the national level. This permits a level of control and uniform oversight that is beneficial to the implementation of a national mine closure policy. There are other notable mining countries in the world where mining is the domain of a state or provincial authority, which is more similar to the situation in Argentina. Notable examples of this include Australia, Canada, and (in some aspects) the United States. While the experience of these non-Latin American countries is outside the scope of this review, it is worth noting that in all cases the lack of a national approach has resulted in significant differences in mine closure policy and financial assurance approaches across each nation. In Canada, for example, there are dramatic differences in the sophistication of closure regulations between the provinces and territories, as well as in the adequacy of the currently constituted financial provisions.

The following sections provide an overview of the current state of mine closure legislation in Chile and Peru, with a summary provided below in Table 1.



TABLE 1. SUMMARY OF CHILEAN AND PERUVIAN MINE CLOSURE PLANNING REQUIREMENTS

HEADING/REQUIREMENT	CHILE	PERU
Specific mine closure law(s) or regulation(s)	Y	Y
Financial Assurance is required	Y	Y
Requires reclamation	Y	Y
Requires EIA	Y	Y
Requires SIA	–	Y
Requirement to submit closure plan prior to end of mine operations	Y	Y
Closure planning to include:		
Post-closure land use	–	Y
Risk and opportunity analysis	Y	Y
Consideration of climate change impacts	–	–
Consideration of physical stability at closure	Y	Y
Consideration of chemical stability at closure	Y	Y
Progressive closure strategy	Encouraged but not required	Y
Post-closure monitoring	–	Y
Success criteria	–	–
Implementation of progressive closure	Y	Y
Social transition plan	Y	Y
Closure cost estimate	Y	Y
Post-closure cost estimate	Y	Y
Plan for temporary or sudden closure	Y	Y



CASE STUDY 1: CHILE

Chile is unique in the Latin American mining context, as it has a larger proportion of large-scale mines relative to other countries such as Bolivia, Ecuador, and Peru, and that have a greater proportion of small or artisanal mining activity. Chile also has perhaps the most rigorous mine closure legislation in Latin America. Formal mine closure legislation was introduced in stages beginning in the mid-1990s, with the most recent piece of legislation coming into effect in 2015 (Law 20.551).

A summary of relevant legislative milestones for mine closure in Chile is presented below:

- 1994: Law 19.300 was the first legislation established in Chile with a requirement to define closure measures.
- 2004: Mine Security Regulation (enacted by Decree 132) added a formal requirement to present closure plans (article 22, 23 and title X), although this requirement did not have cost estimates or financial assurance associated with it, and the focus was largely on physical stability.
- 2007: The regulation for the approval of tailings design, construction, operation, and closure projects (Decree 248) now included requirements for closure measures in its title V.
- 2012: Mine Closure Law 20.551 and its Mine Closure Regulation (Decree 41), a fully modern closure approach for physical and chemical stability, incorporating requirements for providing

financial assurance, were established. The introduction of the law was accompanied by a number of associated guides for the preparation of closure plans, financial assurance calculation, and (later) evaluation of risks. Note that this law is principally concerned with mining operations with extraction over 10,000 tons per month. It also provides a highly simplified approach for closure plans for sites with production rates under this threshold. Furthermore, the environmental impact assessment (EIA) regulation requiring the mine closure planning is amended.

- 2014: End of the Transitory Regime by which companies had a two-year deadline to fully comply with mine closure requirements in Law 20.551.
- 2015: Law 20.819 amended Law 20,551 to include a new category of mining operations (those with monthly extraction of less than 5,000 tons), where a simple “closure declaration” is required, not a detailed closure plan or financial assurance.

A notable aspect of the implementation of the closure law 20.551 in Chile was the use of the “transitory regime.”

This regime provided for a transition period prior to the new law coming into force and the requirement for all mines to have their closure liabilities fully provisioned. During this period,



operating mines were given a limited period of time to provide updated closure plans that summarized all existing closure commitments, such as those acquired through the ESIA process, or the closure plans submitted under previous laws, and for the first time present the estimated cost to implement those measures. This cost estimate then formed the basis of the amount of the needed financial provision. This transitory regime provided a period for both the regulators and mining companies to adapt to the new closure law.

Under Law 20.551 and its associated Regulation, Chile now requires that mining companies seeking to open a mine undertake a formal process of closure planning during the environmental assessment, and present regularly updated closure plans with financial assurance constituted in stages as the mine progresses over its planned life.

CLOSURE PLANS

This review focuses on the requirements under Law 20.551 for mines with an extraction rate over the 10,000 tons per month threshold.

Law 20.551 regulates the closure of mining works and facilities, particularly with respect to closure plans and financial assurance. Once a closure plan is approved, the mining company is legally required to implement the plan to the extent documented. The closure plan must include the following elements:

- Identification of the mining company and legal representatives
- Description of the mine site(s), facilities, site and geology characteristics, operational processes, and mining products
- Results of environmental qualification (ESIA), according to Law 19.300
- Measures and activities proposed to ensure chemical and physical stability on site
- Closure cost estimate for proposed closure plan implementation

- Cost estimate for post-closure measures
- Details of financial guarantee
- Additional documents that form the basis of the closure plan
- Information that would be of public interest related to the infrastructure, or to the anthropological, archaeological, or historical value of the site or natural heritage value
- Community outreach program to be implemented with the closure plan

Only closure plans that meet the requirements of Law 20.551, and sites that have met the environmental qualification requirements, will be approved. Regular updates of closure plans over the life of mine are required at least every five years or when there is a significant change in the mine plan or estimated mine life.

The estimated mine life must be certified by a Qualified Person according to Law 20.235, in accordance with requirements outlined in the legislation, which included possessing a mining-related university title and at least five years of experience. Mining companies subject to these general application terms may have their closure plans audited every five years, at the cost of the mining company, in order to certify compliance with what was included in the plan. When mine plans change or temporary stoppages occur that alter the closure plan, audits are expected to be carried out.

Closure plans are to be updated during mining operations such that they correspond to the mine plans and can be implemented fully and progressively either by the mining company or by a third party at any point in time.

Environmental objectives as listed in the environmental qualification resolution should be incorporated and progressively planned for.

Closure plans are legal documents in Chile, and as such they must be complied with. Completion will be audited following a formal application for the service. Depending on the audit results, either a partial closure compliance certificate or a final closure



compliance certificate will be granted. In order to attain a final closure completion certificate, contribution to the post-closure fund must be made such that costs of ongoing maintenance and monitoring are paid for.

TEMPORARY CLOSURE AND ABANDONMENT

Prior to temporary closure, the temporary closure plan must be approved, which includes measures to ensure maintenance of facilities and mitigation of risk during closure. Temporary closure timelines must be specified (not more than two years) and extensions (up to an additional three years) may be granted if applied for prior to the end of the initial two-year timeframe. If a mining company were to falsely claim temporary cessation of mining in order to hide abandonment of the mine, fines will be applied on a monthly basis.

A temporary closure does not impact in any way the requirement to have a financial assurance in place, in full compliance with all legal requirements.

FINANCIAL ASSURANCE

Financial assurance is required to cover the cost of:

- The closure and post-closure costs for each installation of the mine site
- The administrative cost of implementing closure works
- Contingency costs
- Post-closure monitoring
- Taxes applicable to closure (the IVA or value added tax [*Impuesto al Valor Agregado*])

The law also outlines the fines to be applied for non-compliance with closure plans.

Financial assurance is to be determined based on an estimate of the present value of all costs, with a clearly defined mechanism for setting the discount rate used to calculate the present value.

The discount rate is based on the Central Bank of Chile rate for bonds of at least 10 years (this is for mines with a planned remaining mine life of one to 15 years—longer mine lives require the 20- or 30-year bond rate to be used). It is also important that the formula used to calculate the present value take into consideration not only the year in which the expense is planned to be incurred, but also the certified mine life.

An important subtlety of how the financial assurance is calculated in Chile and the bond rate used in the present value estimate is that value is presented in UF (*Unidades Fomento*), a unit of exchange used in Chile that is adjusted constantly for inflation. In this way, amounts are automatically protected against inflation. The UF is nearly constant in periods of low inflation but would increase rapidly and automatically if a period of high inflation occurs.

Financial assurance may be provided in various forms. Broadly, financial instruments have been divided into three classes (Instruments A1, A2, and A3). Eligible instruments are defined based on the stage of mine life, with only the most secure and liquid instruments permitted in the last third of the mine life. These instruments (classed as A1) include bank bonds, deposit certificates of less than 360 days, bank guarantee receipts, and standby letters of credit from a bank with a risk classification of at least A. As a practical matter, while instruments A2 and A3 are theoretically available to all mining companies at the appropriate stages of mine life, they are not normally considered applicable by larger mining companies. As per Law 21.169, which altered Law 20.551 and became active in June 2020, financial assurance may also be provided in the form of insurance policies. This was introduced to lessen the financial burden on medium- and small-scale mining companies that have greater difficulty providing other permitted forms of A1 financial assurance.

At the start of operations, the mining company must present 20% of the total estimated financial provision amount. The full amount of the financial assurance must then be built up and provided to the government within 2/3 of the



anticipated useful life of mine (when the life of mine is less than or equal to 20 years) or within a period of 15 years from the start of operations where the life of mine is longer than 20 years. The amount and form of assurance are further broken down such that provision is staggered throughout the time period. This approach has the advantage of providing mines with the opportunity to build up the full provision required over the mine life in a way that is transparent, predictable, easily audited, and consistent for all mines. The disadvantage of this approach is that there is no direct technical linkage between the amount of disturbance that has occurred and the financial assurance. This means that it is possible that over the mine life there will be periods when the financial assurance exceeds the actual disturbance or (more likely) where the actual liability on the ground is in excess of the financial assurance amount. The formulation used in Chile is more likely to provide a reasonable reflection of the true liability than the fully linear approach used in Peru.

A detailed breakdown of the eligible financial instruments, their applicability at various stages of mine life, and the methodology used to calculate the amount of the financial assurance (including formulas for present value) can be found in the applicable guide published by the national mining authority (Sernageomin, 2020). This guide also provides considerable detail on the mechanisms for providing and documenting the delivery of the financial assurance to the responsible organization.

Once a mining company is granted a partial or final closure compliance certificate, the mining company is eligible to request a reduction in the financial assurance amount. The mechanisms for partial reduction of financial obligations in response to completion of progressive closure activities are clearly defined in the applicable guidance. This has the benefit of providing mining companies with a clear and quantifiable benefit for the completion of progressive closure works. A final closure compliance certificate ends the obligation of the company to maintain

financial assurance for closure works, and as such, the full remaining guarantee would be returned to the company within 30 days.

POST-CLOSURE STAGE

Law 20.551 dictates that a fund is to be established to hold and cover the costs associated with management of the post-mining sites within the country. The purpose is generally listed as ensuring the physical and chemical stability of the mine site over time, as well as the protection of life, health, and safety of people. In theory, this provides a mechanism for the mining companies to relinquish the property back to the government, with the fund providing the necessary resources to carry out future maintenance. In practice, no mines have yet made such a transition, and regulators have indicated that such a relinquishment should not be expected where there are significant ongoing liabilities (such as water treatment).



CASE STUDY 2: PERU

Peru was the first nation in Latin America to establish a mine closure law that formally required the presentation of financial assurance for closure. The laws applicable to mine closure in Peru, and important parts of the legal framework related to closure, include:

- 1992: DS No. 014-92-EM: The consolidated text of the general mining law
- 2001: Law 27446: Law for National Environmental Impact Evaluation System (Required the submission of a mine closure plan as part of the ESIA process)
- 2003: Law 28090: Mine Closure Law (first Latin American law establishing a requirement for closure financial assurance) and corresponding decrees (DS) and ministerial regulation (RM), including:
 - DS 033-2005-EM (establishes procedures for the preparation and presentation of closure plans)
 - DS 039-2005-EM (entities authorized to prepare closure plans)
 - DS 013-2019-EM (recent update)
 - RM 262-2012-MEM/DM (provides details on the selection of discount and inflation amounts to be used in net present value calculations for closure plans)
- 2005: Law 28611: The General Environmental Law

Mine closure is defined as including activities such as preparation of closure plans that may be conceptual in nature at the beginning of active mine life, to execution of closure and post-closure activities such as monitoring and maintenance. In addition to planning and construction/demolition activities, mine closure also refers to social programs for mine workers and local populations.

Environmental impact assessments are required for all new mining projects, as is an environmental adequacy and management program (PAMA). A conceptual closure plan is required to be submitted as a part of the EIA, and a detailed closure plan is required to be submitted and approved prior to the start of mine operations.

CLOSURE PLANS

Detailed closure plans are to be completed after the first three years of operation and every five years thereafter.

The final mine closure plan should be submitted a maximum of five years prior to the end of operations, and progress reports on closure activities must be submitted every six months. The detailed closure plans are to include the following:

- Main components of the mining project
- A timeline of disturbance with spatial



extent of disturbance throughout the mining life cycle

- A mine waste management program to predict, prevent, and treat if necessary, any acid rock drainage or metal leaching
- A list of all components to remain on site after mining ceases
- Specific closure objectives for each mine component
- Specific closure activities to be implemented during construction, operations, and closure phases in order to achieve closure objectives
- Closure scenarios for temporary closure, progressive, and post closure, including activities for each mine component, care and maintenance activities to achieve final land use
- Expected socio-economic problems to be evaluated according to each of the different closure scenarios, including consultation/stakeholder engagement decommissioning infrastructure.

Additionally, progress reports on closure are required to be submitted every six months and include the proposed closure works for the next six months as well as closure works undertaken in the previous six months and results of those activities. These progress reports are to continue until a closure certificate is provided to the mine.

The final closure plan should evaluate the risks associated with closure works not already undertaken, and will present the following:

- The environmental, land-use, and socio-economic objectives for each component
- Specific activities to be implemented during the closure period
- Monitoring, care, and post-closure maintenance conditions required for each component such that they will meet closure objectives
- A detailed closure schedule
- Cost estimate for closure activities, care, and maintenance during closure and post-closure phases.

The final closure plan must be submitted no more than five years and no less than two years prior to end of mining operations.

TEMPORARY CLOSURE

Temporary closure requires a detailed care and maintenance plan to be developed such that the mine can be restarted within three years of operations ceasing. The temporary care and maintenance plan is to include all measures required to ensure reopening with an emphasis on health and safety, physical and chemical stability over the short term, as well as identification of any social impacts and measures required to mitigate these impacts.

In the event of sudden or unplanned closure, an accelerated closure process is to be implemented. This includes updating the closure plan for review by the regulator, gaining regulatory approval of the closure plan, and implementation of the approved activities.

FINANCIAL ASSURANCE

The amount of financial assurance is to be calculated and updated with each detailed mine closure plan, submitted every five years. The amount of the financial assurance is equal to the total cost to implement the mine closure plan minus any progressive closure measures completed. It is to be divided into equal bond amounts according to the number of active mining years remaining. For new or operating mining projects, the active life will be determined using annual production estimates and the total proven and probable reserves. For exploration activities, the approved schedule in environmental certification is considered to be the active life.

The approach to building up the financial assurance amount is roughly linear over the life of the mine, with the underlying assumption that this will be representative of the amount of disturbance generated by the mine as it develops. This assumption may or may not be realistic and representative.



As the financial guarantee is in place to ensure that closure measures can take place should the mine owner be unable to complete closure activities, the estimate is to be completed under the assumption that a third party is completing all closure works.

The Peruvian law also provides a provision for a blanket financial assurance amount to be provided each year in the case that the company fails to present a closure plan to the authority, or the closure plan is not approved.

The progressive closure budget compiled prior to and during operations is expected to include all progressive closure works, while the final closure budget is to include costs related to final closure activities. The post-closure budget will include an estimate of all costs related to post-closure monitoring and maintenance. Each of the financial assurance cost estimates is required to have an accuracy of +/- 20%. Financial assurances are to be discounted to present value using inflation and discount rates calculated in accordance with RM N° 262-2012-MEM/D. Alternatively, the value of the financial assurance may be presented as a non-discounted constant value with inflation.

Every year that the mine is in operation, the company must provide a renewal of the financial assurance in the form of an approved financial instrument. The operating licence can be revoked if the assurance is not kept up to date. Financial assurance is to be provided in an approved form, that, in accordance with the law, will be sufficiently liquid that it can be easily converted to cash in order to make use of it if necessary. Approved forms include letters of credit or other equivalent financial instruments, an insurance policy (bond) issued by a first-rate firm, a trust in cash or other approved instrument, property other than mining concessions, and securities excluding those issued by the mining company. The ministry of energy and mines may also, by means of a ministerial resolution, add other types of financial assurances to the list of accepted instruments.

The approach to financial assurance is different for small and artisanal miners, with considerably more discretion provided to regional energy and mines authorities to define the appropriate types of financial assurance and to consider collective financial assurances provided that reflect geographical location or other defining characteristics of a group of small or artisanal miners.

POST-CLOSURE STAGE

Article 31 of Regulation DS 033-2005-EM states that the owner of a mine is responsible for the care and maintenance of the mine site for a minimum of five years following its closure. Following this initial five-year timeframe, a third party or the state could assume the care and maintenance, although costs will continue to be covered by the mine owner through the financial assurance previously established and provided.



REFERENCES

LITERATURE REVIEW SOURCES

- Asia-Pacific Economic Co-operation. (2018). *Mine closure: Checklist for governments*. <https://www.apec.org/Publications/2018/03/Mine-Closure---Checklist-for-Governments>
- Holcombe, S. & Keenan, J. (2020). *Mining as a temporary land use scoping project: Transitions and repurposing*. Centre for Social Responsibility in Mining. The University of Queensland. <https://www.mineclosure.net/media/resources/352/mining-as-a-temporary-land-usefinal200318-f.pdf>
- Intergovernmental Forum on Mining, Minerals, Metals, and Sustainable Development (IGF). (2013). *IGF Mining Policy Framework: Mining and sustainable development*. <https://www.igfmining.org/wp-content/uploads/2018/08/MPF-EN.pdf>
- Intergovernmental Forum on Mining, Minerals, Metals, and Sustainable Development. (2020). *IGF guidance for governments: Improving legal frameworks for environmental and social impact assessment and management*. IISD. <https://www.iisd.org/sites/default/files/publications/igf-guidance-for-governments-esia-en.pdf>
- International Council on Mining and Metals (ICMM). (2005). *Financial assurance for mine closure*. <http://icmm.uat.byng.uk.net/en-gb/publications/mine-closure/guidance-paper-financial-assurance-for-mine-closure-and-reclamation>
- International Council on Mining and Metals. (2018). *Integrated mine closure – Good practice guide*. <https://guidance.miningwithprinciples.com/integrated-mine-closure-good-practice-guide/>
- Mining Association of Canada (MAC). (2019). *Towards sustainable mining: 2019 highlights*. <https://mining.ca/wp-content/uploads/2019/12/TSM-Booklet-EN-Web.pdf>

WORKS CITED

- International Council on Mining and Metals. (2005). *Financial assurance for mine closure and reclamation*. <http://icmm.uat.byng.uk.net/en-gb/publications/mine-closure/guidance-paper-financial-assurance-for-mine-closure-andreclamation>
- International Council on Mining and Metals. (2018). *Integrated mine closure – Good practice guide*. <https://guidance.miningwithprinciples.com/integrated-mine-closure-good-practice-guide/>
- International Council on Mining and Metals. (2019). *Financial concepts for mine closure*. <https://www.icmm.com/engb/environment/mine-closure/financial-concepts-for-mine-closure>
- National Directorate of Sustainable Mining Production. (2019). *Guía de Recursos de Buenas Prácticas para el Cierre de Minas*. Ministerio de Producción y Trabajo and Dirección Nacional de Producción Minera Sostenible.
- Sernageomin. (2020). *Guía Metodológica de Cálculo, Determinación, y Disposición de la Garantía Financiera que Establece la Ley No. 20.551, que Regula el Cierre de Faenas e Instalaciones Mineras, Versión 03*.

© 2021 The International Institute for Sustainable Development
Published by the International Institute for Sustainable Development

Written by Golder Associates Ltd. (Bjorn Weeks, PhD, P.Eng, Principal, Principal, Senior Geo-environmental Engineer, Global Mine Closure Lead and Neeltje Slingerland, PhD, Mine Closure Consultant).

IISD

The International Institute for Sustainable Development (IISD) is an award-winning independent think tank working to accelerate solutions for a stable climate, sustainable resource management, and fair economies. Our work inspires better decisions and sparks meaningful action to help people and the planet thrive. We shine a light on what can be achieved when governments, businesses, non-profits, and communities come together. IISD's staff of more than 120 people, plus over 150 associates and consultants, come from across the globe and from many disciplines. Our work affects lives in nearly 100 countries.

IISD is a registered charitable organization in Canada and has 501(c)(3) status in the United States. IISD receives core operating support from the Province of Manitoba and project funding from governments inside and outside Canada, United Nations agencies, foundations, the private sector, and individuals.

IGF

The Intergovernmental Forum on Mining, Minerals, Metals and Sustainable Development (IGF) supports more than 70 nations committed to leveraging mining for sustainable development to ensure negative impacts are limited and financial benefits are shared. It is devoted to optimizing the benefits of mining to achieve poverty reduction, inclusive growth, social development and environmental stewardship.

The IGF is focused on improving resource governance and decision making by governments working in the sector. It provides a number of services to members including: in-country assessments; capacity-building and individualized technical assistance; guidance documents and conferences which explore best practices and provide an opportunity to engage with industry and civil society.

The International Institute for Sustainable Development has served as Secretariat for the IGF since October 2015. Core funding is provided by the Government of Canada.



IGF

INTERGOVERNMENTAL FORUM
on Mining, Minerals, Metals and
Sustainable Development

Secretariat hosted by



Secretariat funded by

