

The importance of governance and the creation of a committee for a progressive mine closure strategy

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Abstract

Kinross Brazil Mining (KBM), which operates the Paracatu mine located in the northwest region of Minas Gerais, Brazil, adopts the concept of ‘mining to close’: an approach in which closure planning is fully integrated into the life of mine strategy, enabling the internalisation of costs, the reduction of future liabilities and the alignment of corporate decision-making with long-term sustainability objectives. Within this framework, KBM established a Technical Mine Closure Committee as a formal governance instrument responsible for coordinating operational areas, identifying synergies and ensuring that progressive closure is conducted in a structured and multidisciplinary manner.

The committee’s governance structure is aligned with the company’s corporate principles, ensuring that social, environmental, technical and economic dimensions are addressed not as compensatory measures, but as strategic components aimed at consolidating KBM’s positioning as a responsible mining company. As part of this strategy, the company reinforces its commitment to collaboratively defining the post-mining land use in partnership with local communities and public authorities, thereby promoting transparency, stakeholder engagement and territorial development.

The committee’s early and integrated action resulted in the establishment of a robust technical body capable of supporting strategic decision-making, reducing initiative fragmentation, mitigating interferences, anticipating risks, optimising resources and institutionalising mine closure within the organisational structure. This collaborative approach enhances operational efficiency, strengthens a just post-mining transition and reinforces governance as a central pillar of progressive mine closure.

Keywords: *progressive mine closure, corporate governance, responsible mining, just transition, post-mining land use, stakeholder engagement, life of mine planning*

1 Introduction

Successful mine closure depends on the integration of environmental, social and economic dimensions across the entire life of a project (International Council on Mining and Metals [ICMM] 2019). From an environmental perspective, mine closure involves environmental rehabilitation and the reduction of long-term liabilities within the territory; from a social perspective, it focuses on establishing constructive relationships with communities and on the shared planning of post-mining land use; and from an economic perspective, it is associated with improved cost predictability through continuously reviewed closure provisions. Underpinning all 3 dimensions, governance integrates multidisciplinary activities to support sound decision-making, and the absence of governance is one of the most persistent sources of risk in mine closure practice.

Mine closure is a fundamental component of the mining life cycle and therefore cannot be treated as an isolated final stage, but rather as a strategic issue that must be considered from the conception of a new project, fully integrated into the long-term planning of the operation (life of mine). However, while operational efficiency

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remains the primary focus of most mining companies, mine closure is still frequently addressed in a reactive manner, characterised by late-stage technical approaches, fragmented initiatives across departments, and limited integration with social management and corporate strategy. Governance over mine closure is often absent, with no dedicated decision-making forums or business processes capable of promoting integration, defining clear roles and responsibilities and anticipating risks before they materialise.

The consequences are tangible. Without a structured governance body, departments tend to operate in silos, planning independently, prioritising their own agendas, and sometimes unknowingly pursuing conflicting objectives. At the Paracatu operation, before the establishment of a formal mine closure committee, teams from different areas had, on separate occasions, developed projects competing for the same physical location, showing a direct result of the absence of a coordinated decision-making space. Beyond such conflicts, the full complexity of closure-related actions only becomes apparent once an integrated view is established: the volume and interdependency of activities required to reach well-defined closure outcomes is consistently underestimated when departments work in isolation.

For Kinross Gold Corporation, a Canadian-based mining group with a global presence, of which Kinross Brazil Mining (KBM) is a subsidiary, responsible mining generates sustainable value for investors, host countries and communities. Accordingly, the company is strongly committed to creating positive socio-economic benefits and improving quality of life both during and beyond the mine life. This international positioning is reflected in KBM's strategy for its Paracatu operation in Minas Gerais, Brazil, where the company has adopted a progressive mine closure approach supported by a structured governance framework, transforming mine closure into a continuous process integrated with operations. The concept of 'mining to close', increasingly adopted in mine planning, reverses traditional logic by positioning mine closure not as a consequence of mining activities, but as a core project premise that guides operational, environmental, social and financial decisions from project conception through to the post-closure phase, with a focus on long-term stability, liability minimisation and sustainable value creation.

To give effect to this strategy, KBM established the Technical Mine Closure Committee, a formal governance body that brings together multidisciplinary teams to coordinate closure-related activities, identify synergies and ensure that decisions are made collectively and transparently. Early engagement of impacted stakeholders is integral to this approach, building trust, reducing conflicts and enabling more grounded definitions of post-mining land use, reinforcing both the social licence to operate and the company's commitment to a just transition. This paper aims to describe the context and strategic rationale behind the establishment of mine closure governance and its committee, from an innovative and proactive perspective.

2 Context

KBM operates the Paracatu mine, located in the municipality of Paracatu, in the northwestern region of the state of Minas Gerais, Brazil. It is one of the largest open pit gold mines in the world. The operation is situated within a territory where mining has historically played a structural role in local economic development, maintaining close physical and socio-economic proximity to the urban area and several adjacent communities. Over the course of its operations, KBM has consolidated a significant relationship with the territory, characterised by employment and income generation, social investments and continuous dialogue with multiple local stakeholders. In this context, the mine closure plan (Plano de Fechamento de Mina – PFM) has been progressively developed and enhanced, in line with the evolution of the Brazilian regulatory framework and international best practices, gradually incorporating environmental, social and governance (ESG) aspects, as well as stakeholder participation and engagement mechanisms throughout the mine life cycle.

Since 2021, the mine closure plan has been regulated by Resolution No. 68 of the Brazilian National Mining Agency (Agência Nacional de Mineração 2021), which replaced former Mining Regulatory Standards No. 20.4 and No. 20.5 issued in 2001. The resolution introduces a paradigm shift for mine closure in Brazil. The mine closure plan is now required for any mining operation holding active mining titles throughout the entire project life cycle, including early project stages, fully integrated with the mine plan. This new approach contrasts with the previous regulatory framework, which allowed late preparation of mine closure plans,

often treating closure as a final phase of the operation. Under the former scenario, companies tended to focus on area decommissioning rather than investing resources in integrated and forward-looking planning that would allow closure activities to be phased over time, risks to be minimised, ecological functions to be restored and socio-economic functions to be re-established in impacted areas.

This shift in the regulatory basis for mine closure brings Brazil closer to practices promoted by international institutions such as the International Council on Mining and Metals (ICMM). In its *Integrated Mine Closure – Good Practice Guide* (ICMM, 2019) and subsequent updates, the ICMM provides guidelines for its members and other mining companies committed to responsible mining, aiming to foster a disciplined and integrated approach to mine closure planning and to enhance standardisation of good practices across the mining sector. The document, which is an update of the 2008 publication *Planning for Integrated Mine Closure: Toolkit* (ICMM, 2008), outlines key elements required to effectively integrate mine closure throughout the entire mine life cycle, guiding companies toward more proactive and anticipatory positioning. The guide seeks to support the creation of a positive post-mining legacy that balances environmental protection, social well-being and financial performance through the integration of environmental, social and economic dimensions (ICMM, 2019).

Regarding promoted best practices at the national level, the Brazilian Mining Institute (Instituto Brasileiro de Mineração – IBRAM) translates international mine closure best practices for application in the Brazilian context. In 2013, the institution published the *Mine Closure Planning Guide* (ICMM 2013), followed in 2024 by complementary documents, namely the *Indicator Guide for Mine Closure Planning* (Instituto Brasileiro de Mineração 2024) and the *Sustainability Criteria Guide for Mine Closure* (Instituto Brasileiro de Mineração 2024). Acting as an intermediary between global standards, Brazilian mining companies and regulatory bodies such as ANM, the Brazilian Mining Institute provides practical guidance that should be considered within the governance framework of progressive mine closure. By incorporating and translating global trends, the Brazilian Mining Institute influences mining practices in Brazil and consolidates technical understanding. Efficient governance, which includes the identification and mitigation of socio-environmental impacts, as well as early mine closure planning that considers not only environmental rehabilitation but also the socio-economic reintegration of affected areas, constitutes a fundamental pillar of the closure process (Jesus et al. 2025). Consequently, ANM Resolution No. 68 can be interpreted as a regulatory translation of best practices originally promoted by the ICMM and adapted to the Brazilian context by the Brazilian Mining Institute.

Despite advances at the regulatory and institutional level, the internal management of mine closure within organisations continues to face significant governance challenges, particularly in operations with long life of mine horizons, where closure remains less tangible for internal teams. The degree to which closure considerations are embedded in daily operations depends less on regulatory requirements and more on an organisation's capacity to structure closure as a strategic agenda. Mining companies aligned with responsible mining frameworks, such as Kinross Gold Corporation, which operates under the principles of the ICMM, the Towards Sustainable Mining program, the UN Sustainable Development Goals, and the UN Guiding Principles on Business and Human Rights, recognise that the effectiveness of the mine closure plan is directly linked to senior management commitment and its dissemination across all organisational areas. The adoption of formal, multidisciplinary monitoring mechanisms contributes to greater internal engagement and alignment in closure planning (Sánchez et al. 2013).

Governance, in the context of this article, can be understood as a set of structures, guidelines, processes and responsibilities designed to support decision-making throughout the entire life of an enterprise. Accordingly, with the objective of acting in a proactive and preventive manner, KBM established its formal mine closure governance mechanism in January 2025: the Technical Mine Closure Committee. The initiative was developed by KBM in partnership with Verum Partners, with the purpose of bringing together, within a single forum, the different disciplines and resources required for the effective planning and execution of progressive mine closure.

The 'mining to close' strategy adopted by KBM is guided by 7 core principles:

1. Integration with the life of mine plan: the mine closure plan is not a standalone document but is fully embedded in the mine plan, ensuring closure is planned progressively rather than deferred.
2. Early definition of post-mining land use: desired future uses inform current operational decisions.
3. Progressive closure: area rehabilitation and validation of trials and solutions are conducted during operations, not only at end of life.
4. ESG integration and social licence: generating a positive legacy is treated as equally important as operational excellence.
5. Financial accuracy: closure provisions are realistic, financeable, and regularly updated.
6. Long-term monitoring and adaptive management: closure is treated as a dynamic process requiring continuous adjustment.
7. Governance and institutionalisation: without robust governance, the 'mining to close' strategy cannot be sustained.

3 Creating the committee

Establishing the Technical Mine Closure Committee (*Comitê Técnico de Fechamento de Mina*) began with an institutional and organisational mapping exercise to identify the areas directly and indirectly involved in mine closure activities. Based on each area's operational relationship with the 3 core themes of closure – mine, tailings structures and projects – focal points and leadership representatives were selected as committee members. The committee currently includes representatives from several teams: Sustainable Development, Geotechnical Structures, Environment, Project Management, Land Management, Licensing and Legal Affairs, Continuous Improvement, Technical Services, Human Resources, Institutional and Community Relations, Utilities, and Integrated Management.

The committee's general objective is to integrate areas across the organisation to ensure that all closure activities are carried out at the right time and within budget, increasing cross-departmental engagement. Its specific objectives are to monitor the status of progressive closure actions with a focus on risk minimisation and interference management, to analyse and formally deliberate on agenda items, and to report progress to the Executive Board.

Meetings are held every 2 months, in hybrid or in-person format, with an average duration of 2 hours. Every 6 months, a dedicated session is held to address future land use. To support meeting preparation, a defined updated cycle operates in the weeks preceding each session: Verum Partners consolidates inputs from all relevant areas and shares updated materials with the Sustainable Development team for internal review prior to each committee meeting. Following each session, a formal deliberation report is issued that summarises decisions, progress updates and points requiring attention. Quarterly, key developments are escalated to the Executive Board through KBM's internal reporting cycle.

From its inception, the committee has operated under a formal governance structure, underpinned by KBM's internal mine closure normative, which establishes the principles, guidelines, responsibilities and minimum requirements for the governance of mine closure planning, execution, monitoring and review. The normative is subject to a biennial review cycle, ensuring it remains aligned with operational developments, regulatory updates and governance improvements. The committee has been operating since January 2025.

The organisational structure (Figure 1) maps the flows between governance levels and functional areas. Support areas provide assistance to technical areas and may contribute within their scope at specific points; technical areas maintain continuous bilateral interaction flows given their interdependencies. The Technical Mine Closure Committee connects these structures and feeds technical areas with its deliberations, while periodic updates are escalated to the Executive Committee, composed of Executive Board representatives responsible for strategic decisions on closure projects, capital expenditure, financial provisions and schedules. These relationships are illustrated in Figure 1.

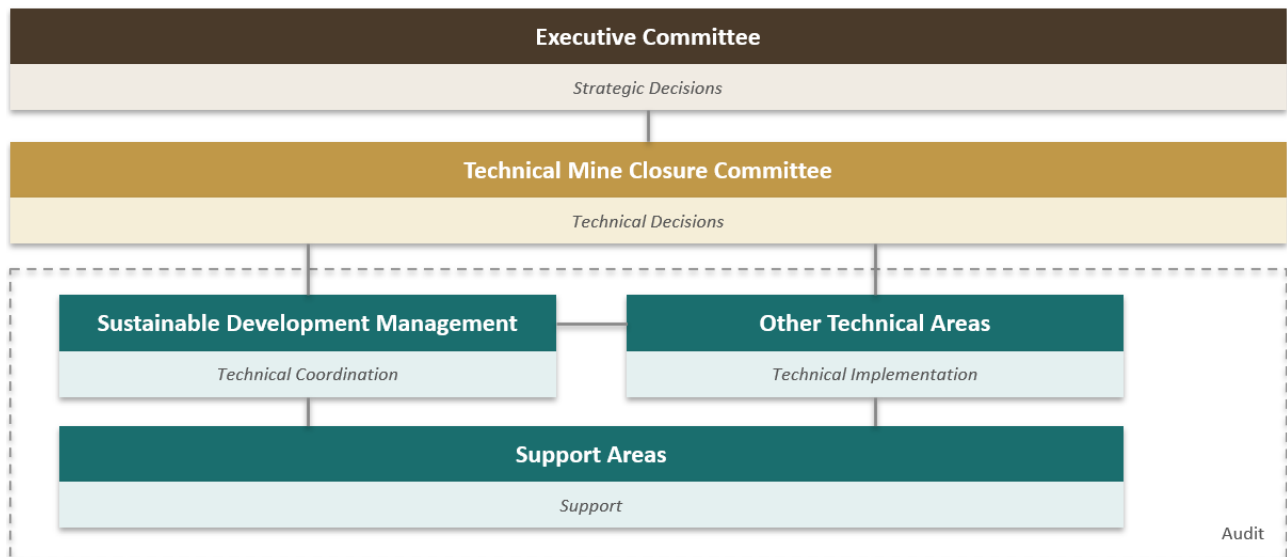


Figure 1 Mine closure organisational structure

Consistent with the structure presented in the Figure 1, the committee is composed of representatives from the functional groups involved in mine closure planning and implementation. In addition to Sustainable Development Management, participation includes the technical functions of Technical Services, Geotechnical Structures, Project Management, Environment, Utilities, Institutional and Community Relations, and Human Resources, as well as the support functions of Finance and Accounting, Controllershship, Continuous Improvement, Legal Affairs, and Supply Chain Management.

Governance is further supported by a knowledge management system integrated with the committee, which serves as a repository for all closure-related documentation. The system stores meeting minutes, the most up-to-date version of the master plan, action plans, project files for all closure-related initiatives, presentations, workshops and regulatory records, organised into a standardise thematic structure and subject to defined retention periods, access controls and periodic review cycles. This ensures robustness and full traceability throughout the mine closure process.

4 Results

The establishment of the Technical Mine Closure Committee has produces tangible outcomes across governance, planning and operational culture at KBM – outcomes that would not have been achievable through the fragmented, department-led approach that preceded it.

4.1 Integrated master plan

One of the most significant deliverables generated through the committee was the consolidation of all closure-related projects, actions and studies into a single integrated master plan. Prior to the committee's creation, no such consolidated view existed: closure activities were tracked, when tracked at all, in isolation by individual departments, with no unified timeline connecting them. The master plan developed through the committee encompasses 829 activities across the structural fronts, like Santo Antônio tailings dam, pit, specific tanks, potentially acid forming (PAF) waste piles, Eustáquio tailings dam, non-acid forming (NAF) waste piles, landscaping and other general actions, extending through the completion of all closure activities. This tool has fundamentally changed how closure is managed internally: teams now work from a shared, continuously updated reference that makes deadlines, interdependencies and outstanding studies visible across the organisation.

4.2 Elimination of planning conflicts

Before the committee existed, departments operated largely in silos, developing projects independently and without systematic coordination with other areas. The consequences were concrete: on at least one occasion, separate teams from 2 different departments were found to have developed competing projects for the same physical location, a conflict that went undetected until it was raised within the committee's integrated review process. The committee's multidisciplinary structure, which brings together representatives from 13 functional areas in a shared deliberation space, provides the institutional mechanism to identify and resolve such conflicts before they translate into rework, cost overruns, or schedule impacts.

4.3 Brazilian Mining Institute gap analysis

In 2024, KBM commissioned an independent maturity assessment against the 3 mine closure guides published by the Brazilian Mining Institute: the *Mine Closure Planning Guide* (7 guidelines, 37 best practices) and the 2 guides published by the Brazilian Mining Institute in November 2024, the *Indicator Guide for Mine Closure Planning* (38 indicators) and the *Sustainability Criteria Guide for Mine Closure* (6 best practices, 6 indicators). Conducted by Verum Partners, the assessment translated the 45 best practices across the 3 guides into 704 auditable requirements. The results indicated that KBM was fully adherent to 66% of requirements, partially adherent to 18%, non-adherent to 9% and the remaining 7% were not applicable. The exercise produced a structured action plan covering the steps required to advance maturity across all applicable requirements, with all resulting actions incorporated directly into the master plan. Periodic reassessments are planned to track the evolution of KBM's maturity score as actions are implemented over time. While the gap analysis was commissioned independently of the committee, the governance structure and multidisciplinary integration promoted by the committee have contributed directly to KBM's adherence levels, with several requirements addressed precisely because closure topics are now discussed systematically across all relevant departments. The committee also contributed to greater recognition of the assessment's relevance across the organisation, resulting in stronger participation from the involved areas throughout the evaluation process and facilitating the identification, discussion and validation of evidence against the requirements.

4.4 Ownership culture across operational teams

Perhaps the most qualitative, but no less significant, outcome has been the shift in how operational teams relate to the concept of mine closure. Prior to the committee being formed, closure was broadly perceived as a future concern, disconnected from day-to-day operational decisions. Since the committee began operating, teams have progressively internalised the 'mining to close' principle: projects being designed for the operational phase are now routinely planned with explicit consideration of how the relevant area will be decommissioned and rehabilitated. This cultural shift, from closure as an end point to closure as a design parameter, represents a fundamental change in operational mindset that no regulatory requirement alone could have produced.

4.5 Knowledge sharing and organisational learning

Beyond formal deliverables, the committee has created an informal but valuable channel for knowledge exchange across departments. As teams present their projects and challenges in a shared forum, practical solutions developed in one area become visible and accessible to others, reducing duplicated effort and accelerating problem-solving. This dynamic, arose naturally from the committee's multidisciplinary structure, reflects one of the less tangible but most enduring benefits of integrated governance: the gradual construction of institutional knowledge about mine closure that transcends individual departments and persists within the organisation over time.

5 Conclusion

The work presented in this paper reinforces the critical importance of institutionalising governance structures for progressive mine closure and demonstrates, through a real operating case, that this institutionalisation is both achievable and consequential. The Technical Mine Closure Committee, established at KBM's Paracatu operation in January 2025, has moved beyond a governance concept to become a functioning mechanism that has already produced measurable outcomes: the consolidation of hundreds of closure activities into a single integrated master plan, the identification and elimination of planning conflicts between departments, an independent maturity assessment against the Brazilian Mining Institute's best practice guides, and a meaningful shift in how operational teams plan and execute their work, embedding the 'mining to close' principle into daily decision-making.

One of the central contributions of this paper is a governance model that is replicable across the mining sector. The framework is not specific to KBM's scale or context: its core elements – a formal multidisciplinary committee, clearly defined roles and responsibilities through RACI (responsible, accountable, consulted, informed) and SIPOC (suppliers, inputs, process, outputs and customers) matrices, an integrated master plan, a knowledge management system and structured escalation to executive governance – can be adapted to operations of different sizes, life of mine horizons and regulatory environments. What the KBM experience demonstrates is that the effectiveness of a mine closure plan depends less on the quality of the technical document itself and more on the organisational capacity to manage closure as a live, cross-functional strategic agenda.

From a practical standpoint, the adoption of structured progressive mine closure governance enhances the applicability of planning best practices, reduces environmental, social and financial risks, and strengthens the social licence to operate, generating long-term value and resilience for the business. From a scientific perspective, the framework advances the understanding of mine closure by integrating governance, multidisciplinary management and stakeholder engagement into a single operational model, addressing a gap in the literature that has historically treated mine closure as a fragmented process and social dimensions as compensatory rather than value-creating.

Finally, the establishment of the Technical Mine Closure Committee has strengthened KBM's ESG strategy by embedding closure as a genuine operational commitment, not a future liability to be managed, but a present responsibility to be planned, monitored and continuously improved. Future studies are encouraged to apply and empirically validate similar governance frameworks across other mining operations and to develop social indicators capable of measuring just transition outcomes for communities and territories affected by mine closure.

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