Mine Closure 2024 – AB Fourie, M Tibbett & G Boggs (eds)

doi:10.36487/ACG_repo/2415_10

# The regulatory journey to improving mine closure success in Western Australia

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## Abstract

*Western Australia (WA) has a long and prosperous history in mining. The nature of mining requires some regulatory flexibility as many variables influence the life and economics of a project. Innovations in mining technology can turn a suspended mine into a viable one. Many mines continue beyond the initial forecasted mine life and may even be transformed to another post mining land use rather than rehabilitated back to native ecosystem. Some mines may even be 'recycled' enabling today's waste to be used as tomorrow's resource. Add to the mix community's expectations for mined land to be rehabilitated and made safe, and the regulators of mine rehabilitation have a challenging conundrum.*

*The Department of Energy, Mines, Industry Regulation and Safety (DEMIRS) aims for responsible development of resources and is the lead agency for mine closure in WA. The requirement for mine closure plans was introduced to the Mining Act 1978 in 2010 and led to the publication of 'Guidelines for Preparing Mine Closure Plans' in 2011 which drew national and international attention (DMP 2011). Hundreds of Mine Closure Plans (MCPs) later, mine closure planning is more mature with improved stakeholder engagement, research to close knowledge gaps and development of completion criteria. However, there has not been a noticeable increase in successfully closed mines being presented to government for relinquishment. This is despite there being many inactive mines with no exploration activity and appearing they would be better closed with post mining land use(s) enabled.*

*Perhaps the process to seek relinquishment is not well understood? In an effort to demystify the process for seeking relinquishment under the Mining Act (i.e. formal acceptance from DEMIRS that rehabilitation and closure objectives under the Mining Act have been met), DEMIRS published the* Mine Closure Completion Guideline *in November 2021 (DMIRS 2021). Some companies have followed this guideline and received formal acceptance for parts of their mined areas, however progression towards successful closure still remains an elusive and sometimes half-hearted goal for many mines.*

*The Mine Closure team at DEMIRS is undertaking a body of work in an effort to further the journey to improve the regulation of mine closure to enhance mine closure outcomes in WA. This work will explore ways to highlight the benefits of successful mine closure and that deferral of progressive rehabilitation and closure through prolonged periods of unjustified suspension of operations (care and maintenance) is a less attractive option.*

*DEMIRS is working with other state government agencies with a regulatory role in mine closure to establish alignment in understanding what acceptable residual risk looks like for closed mines in WA.*

*Other projects are planned by DEMIRS to improve timely regulatory intervention when poor closure practices are identified. DEMIRS looks forward to engaging with stakeholders as these continuous improvement projects progress and future initiatives developed to continually improve assurance that resources are mined responsibly in WA.*

**Keywords:** *regulation, care and maintenance, relinquishment, guidelines and responsible resource development*

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# 1 Introduction

Mining in Western Australia (WA) dates back to the 1880s with gold discoveries in Coolgardie and Kalgoorlie. WA has just over 800 mines which extract a range of commodities such as iron ore, gold, spodumene, alumina, nickel and copper, and generate significant wealth to the Australian economy. In 2023, WA rated fourth in the Investment Attractiveness Index behind Utah, Nevada and Saskatchewan (Mejia & Aliakbari 2024). WA's mineral resources sector is critical to the local and national economy and achieved sales on production valued at AUD 192 billion in 2023 providing 130,165 full-time equivalent jobs in employment (DEMIRS 2024).

The Department of Energy, Mines, Industry Regulation and Safety (DEMIRS) is the key regulator of the mining industry in WA and aims for responsible development of resources. The key roles in regulating mining at DEMIRS include regulation of tenure, resource exploration and development, royalties, mine safety and environmental regulation. This paper focuses on the environmental aspects of mining regulation in WA under the *Mining Act 1978* (Mining Act), specifically mine closure.

Taking the lead in the regulation of mine closure in WA, DEMIRS introduced the requirement for mine closure plans (MCPs) to the Mining Act and published *Guidelines for Preparing Mine Closure Plans* (MCP guidelines) in 2011 (DMP 2011). A MCP was required to be submitted with a mining proposal when seeking environmental approval to mine under the Mining Act. This drew national and international attention, with other regulators either adopting WA's guidelines or influencing the creation of their own guidelines. Prior to the introduction of these MCP guidelines, environmental impact assessment documents used in WA to seek environmental approval to mine (e.g. Mining Proposals/Notices of Intent under the Mining Act), merely required information on how the mining disturbance was to be rehabilitated. Some mining projects assessed under the *Environmental Protection Act 1986* were issued Ministerial Statements that required a decommissioning plan, but had no guidelines specifying the information required in such a plan. Documents following either regime did not provide the comprehensive level details for mine closure planning that we expect today. There was no specific requirement for a stakeholder engagement strategy, no details of closure implementation, no financial provisioning for closure and no development of completion criteria to name a few. Instead, proponents were encouraged to draw on references such as:

- *Strategic Framework for Mine Closure*; Australian and New Zealand Minerals and Energy Council and the Minerals Council of Australia (ANZMEC & MCA 2000)
- *Mine Closure and Completion, Leading Practice Sustainable Development Program for the Mining Industry; Department of Industry*, Tourism and Resources (DITR 2009)
- *Mine Rehabilitation, Leading Practice Sustainable Development Program for the Mining Industry; Department of Industry*, Tourism and Resources (DITR 2006)
- *Planning for Integrated Mine Closure: Toolkit*; International Council on Mining and Metals (ICMM 2008).

MCPs received were inconsistent and difficult to assess.

The MCP guidelines have since been revised in 2015 (DMP 2015), 2020 (DMIRS 2020) and a fourth version will be published in late 2024. Over a decade of experience in assessing hundreds of MCPs prepared in accordance with those guidelines has passed and overall mine closure planning in WA has advanced. Mine closure is more openly discussed, knowledge gaps are identified and documented with timeframes, and more mining companies have improved in the field of stakeholder engagement for mine closure.

Having regulated mine sites before and after the introduction of MCP requirement, it is evident that mining operators generally have a more comprehensive understanding of their mine sites, particularly those operating on older sites that had poor record keeping practices. For example, operators of such mine sites have undertaken investigations such as waste characterisation of stockpiles and developed rehabilitation strategies for inclusion into a MCP. As a regulator, DEMIRS sees the full spectrum of performance in closure

planning, ranging from those mining companies doing the bare minimum to those that have resourced a closure team that strives to demonstrate leading practice in whole of mine life planning.

However, since the formal introduction of MCP in the Mining Act, aside from some progressive rehabilitation occurring, overall there has not been a noticeable increase in successfully closed mines in WA. This is despite there being many inactive mines that are not being explored for further resource development. Rather than having deteriorating mines dotted across the landscape, it is preferred that such mines be closed and the post mining land use(s) enabled.

## 2 Dealing with the past

The long and prosperous mining history in WA has resulted in a legacy of old mines that have been abandoned. WA commenced an abandoned mine sites database in 2002 following a fatal accident at an abandoned mine near Cue (approximately 640 km north–northeast of Perth) in 1997 (Data WA 2024). Initial data collection targeted regional centres with a history of mining. A range of mining related features were recorded including excavations, waste dumps, tailings storage facilities and infrastructure. The register continues to receive data as further abandoned mine features are discovered and reported to the Abandoned Mines team at DEMIRS. There are over 192,000 recorded mine features in the register, which covers approximately 76% of the high priority historic mine sites in WA.

To address the cost of rehabilitation of abandoned mines, DEMIRS established a pooled fund known as the mine rehabilitation fund (MRF) to which mining operators are required to contribute to annually. The *Mining Rehabilitation Act* was enacted in 2012 and all holders of tenements operating under the Mining Act are required to annually report disturbance data, including land under rehabilitation to DEMIRS. A rehabilitation liability estimate (RLE) is calculated using rates ranging from AUD 2,000 to AUD 30,000/ha depending on the type of disturbance. A levy of 1% of the RLE is charged to tenement holders annually when the RLE is over AUD 50,000. The less land disturbed, the lower the levy contribution, which incentivises minimising disturbance via progressive rehabilitation.

Money in the MRF is used to rehabilitate abandoned mines in WA when the tenement holder has failed to fulfil rehabilitation obligations and efforts to recover funds from the tenement holder have been unsuccessful. Interest generated from the MRF supports the administration of the fund and to undertake rehabilitation on legacy mines, which are those mines that were abandoned prior to the introduction of the MRF and therefore had not contributed to the MRF. Paying into the MRF does not absolve the tenement holder of their legal obligation to rehabilitate mining disturbances on their tenements.

In 2023, a total of 187,097 ha of unrehabilitated disturbance and 43,876 ha of land under rehabilitation was reported for sites operating under the Mining Act. This does not represent the total disturbance of all mined land in WA as mines operating under a State Agreement Act are not required to contribute to the MRF. The 2022–23 Annual MRF Report reported AUD 42.8 M in MRF levies were received, bringing the MRF total to AUD 291.2 M (DMIRS 2023). Just over AUD 28 M has been spent since the establishment of the fund in 2013. DEMIRS has an Abandoned Mines Program that uses funds generated through the MRF to rehabilitate abandoned mines in WA. Some recent project highlights of DEMIRS Abandoned Mines team include the deconstruction and clean up at Ellendale diamond mine in the Kimberley region of WA and the ‘Safer Shafts for Towns’ project where abandoned shafts in close proximity to regional communities were remediated.

Regulation of mining disturbance and rehabilitation is challenging. Exactly when does a mine have to rehabilitate or start transitioning to the next land use? Many mines continue beyond the initial predicted mine life as further exploration occurs during operations finding further resources. On top of that, mining operators in WA are able to suspend operations and enter ‘care and maintenance’ for undefined lengths of time. This generally occurs when it is no longer economic to continue mining operations following a fall in commodity price. The MCP requires details on how the mine will be managed during such periods, but the diligence companies apply to ‘care and maintain’ their mines is variable. All too often there can be limited funds, machinery and site personnel to manage the mine to an acceptable standard and regulating such mines can be frustrating.

# 3 Striving to improve mine closure in Western Australia

In addition to introducing the requirement for MCPs in 2010 and the MRF in 2012, DEMIRS has developed other initiatives to further improve mine closure success in WA. After several years of assessing MCPs, it became obvious that the WA mining industry needed further guidance on how to develop SMART[†] completion criteria. DEMIRS approached the Western Australian Biodiversity Science Institute in 2015 and a collaborative project involving universities, industry and regulators during 2017–2019 resulted in the publication of a 'Framework for Developing Completion Criteria and Risk-Based Monitoring' in 2020 (Young et al. 2020). This document was generally well received and those that follow the framework now consider post mining land use options ahead of developing completion criteria and some even link in an effective monitoring regime. Whilst it may be too soon to see the influence of this framework on mine closure success, there are high hopes for the future.

In an effort to demystify the process for seeking relinquishment under the Mining Act (i.e. requesting formal acceptance from DEMIRS that rehabilitation and closure objectives under the Mining Act have been met), DEMIRS developed and published the *Mine Closure Completion Guideline* in November 2021 (DMIRS 2021). This guideline describes the information and evidence needed to demonstrate when agreed completion criteria have been met. Whilst there are now a few examples where mining companies have received formal acceptance for parts of their mined areas, progression towards successful closure still remains an elusive and sometimes half-hearted goal for many mines.

The economic viability of a mine can drastically change for the better or the worse in a short period of time. Innovations in mining technology can turn a suspended mine into a viable one and some mines may even be 'recycled', enabling today's waste to be used as tomorrow's resource. There are around 230 mines under care and maintenance in WA, some of which have been this way for over 40 years. How long is too long to enable a mining company to fully develop a resource? When does such a situation drift too far from DEMIRS principle of ensuring responsible resource development?

# 4 Future directions

The Mine Closure team at DEMIRS is undertaking a body of work in an effort to continue the journey of improving the regulation of mine closure to enhance mine closure outcomes in WA.

## 4.1 Targeted regulation

WA is the largest mining jurisdiction in Australia. Regulatory resources need careful management to ensure timely assessment of new or changing mine projects to keep WA's mining engine functioning together with maintaining an effective compliance program to ensure community confidence in the regulatory framework.

The timing and focus of compliance activities are critical to achieving desired outcomes. It is often more effective to use regulatory actions to steer a company back on track in the early to mid-operational phase of a mine before a mine reaches the stage when profits and resources are dwindling. There is a need to improve timely regulatory intervention when poor mine closure practices are discovered. Collaborative work across the Closure and Compliance Teams at DEMIRS aims to identify a suite of triggers that will be matched with appropriate compliance action(s) to drive more effective closure preparedness on mines. Examples of measures being considered included pragmatic of implementation of financial assurance policies (unconditional performance bonds) and exploring opportunities to strengthen the Mining Act. Having a structured approach will provide our inspectors with clear pathways when responding to various observations and give consistent messaging to industry regarding the importance of preparing well for closure and transitioning to the next land use across the regions in WA.

[†] SMART – specific, measurable, achievable, realistic and timebound.

## 4.2 Relinquishment versus care and maintenance

Allowing mining operators to suspend operations for undefined periods of time appears to have led to a culture of mine closure avoidance. The future of the mining industry is dependent on the legacy it leaves (DIIS 2016). There is a need to change the mindset of those in the mining industry that consider rehabilitation to be optional.

The Closure Team at DEMIRS will endeavour to explore ways to improve regulatory oversight of mining companies that defer rehabilitation and closure through prolonged periods of care and maintenance with no clear mining future. There is a need to be more discerning with such mines. The potential for further resource development needs to be weighed against actual closure costs. If the closure costs far outweigh the financial benefits of further resource development, then is it appropriate for a company to suspend operations rather than implement full or partial mine closure? In many cases, the rehabilitation of some parts of a mine could enhance future closure outcomes without preventing future mining operations recommencing.

To complement the above project of applying closer scrutiny to mines entering care and maintenance, DEMIRS intends to encourage companies to strive to seek and achieve relinquishment by improving transparency of the process and highlighting the benefits of successful mine closure and relinquishment. Actions being considered include showcasing examples of successful relinquishment, improving the transparency of the reasons behind acceptance or rejection decisions, and promoting some administrative advantages (e.g. no more MRF payments, annual reporting or regular revision of MCP) and of course the accolades that comes with meeting obligations in the eyes of regulators and the broader community to name a few.

Regulators in WA have extensive experience with approving mines but less so with the process of evaluating whether a mine has adequately met completion criteria and accepting back mined land on behalf of the Western Australian community. Mine closure in WA is no longer a future notion – it is happening now. For example, the Argyle Diamond mine in the Kimberley region of WA ceased mining in 2020 and is currently implementing closure works. Coal-powered stations in WA will be retired by 2030, leaving coal mining in Collie in the southwest region facing closure and transformation to the next land use(s) in the near future. In 2023, the Commonwealth Scientific Industrial Research Organisation (CSIRO) reported that 240 mines in Australia are projected to close by 2040, 115 of those mines are in WA (CSIRO 2023).

With this shift comes opportunities to regulate the mining industry in a way that leads to leaving a more positive post mining legacy than that left by its predecessors. However, DEMIRS is not the only regulator linked to mine closure in WA. Other State agencies connected with a key decision-making role in mine site relinquishment are listed in Table 1. There is a need to explore the risk appetite of these regulatory agencies responsible for accepting mined land after completion criteria are met, and ultimately relinquish the mining company of its environmental obligations (where the legislation allows). It is well and truly time for government agencies to explore what acceptable residual risk looks like for closed mines in WA. This journey will explore the experiences of other regulators both nationally and internationally in developing the optimal pathway for WA. DEMIRS is already following progress with mining rehabilitation reforms introduced in Queensland in 2020 (DESI 2020)

**Table 1 Key State Government agencies with a key role in mine closure and relinquishment in WA**

| Agency | Legislation | Role in mine closure |
|---|---|---|
| Department of Energy, Mines, Industry Regulation and Safety | *Mining Act 1978*<br>*Work Health and Safety Act 2020* | Regulates the environmental management, tenure and safety of employees in the resource sector under the Mining Act and WHS Act and has an advisory role in providing technical advice to the Department of Jobs, Tourism, Science and Innovation for State Agreement Act sites* |
| Department of Water and Environmental Regulation | *Environmental Protection Act 1986*<br>*Contaminated Sites Act 2003* | Manages and regulates WA's environment and water resources |
| Department of Jobs, Tourism, Science and Innovation | Facilitate State Agreement Acts* | Facilitates multiagency interactions with complex resource and infrastructure projects |
| Department of Planning, Lands and Heritage | *Land Administration Act*<br>*Aboriginal Heritage Act 1972* | Responsible for State level land use planning and management, including the protection of Aboriginal heritage |
| Department of Biodiversity, Conservation and Attractions | *Biodiversity Conservation Act 2016* | Protects biodiversity and manages land set aside for conservation |

* State Agreements are contracts between the Government of WA and proponents of major resources and infrastructure ratified by an Act of State Parliament.

# 5 Conclusion

The mining industry recognises that to gain access to future resources, it needs to demonstrate that it can effectively manage and close mines with the support of the communities in which it operates (DIIS 2016). If effective closure planning has occurred during operations, with a clear understanding of what regulatory agencies consider acceptable, then it is reasonable to expect relinquishment to be an achievable outcome if mines are mined with the next agreed post mining land use(s) in mind.

The journey to improve the regulation of mine closure in WA is ongoing. DEMIRS continues to promote responsible resource development in an ethical, fair and transparent manner and looks forward to engaging with stakeholders as these continuous improvement projects progress.

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