LOCK THE GATE ALLIANCE

AUSTRALIANS WORKING TOGETHER TO PROTECT OUR LAND, WATER, AND FUTURE

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Thank you for the opportunity to comment on the "*Improving Mine Rehabilitation in NSW*" discussion paper.

We have addressed issues outlined in the discussion paper but have also added commentary and recommendations in regards to three other priority reforms including managing mines in care and maintenance, determining and managing residual risk and a full, independent review of NSW's financial assurance calculator.

We look forward to further discussion with the Department of Planning and Environment about the detail of proposed reforms outlined in this discussion paper.

In summary, Lock the Gate proposes the following additions and amendments to the approach proposed by the Department:

1. Adopt a more ambitious goal to *eliminate*, rather than minimise, land sterilisation, in keeping with the public's expectations.
2. The views of affected communities and landholders must be fully implemented in the design of final land forms and land uses.
3. More specific actions and requirements are needed to address ground and surface water resource rehabilitation.
4. Rehabilitation planning and regulation must be informed by a long-term vision in defining the sustainability or otherwise of post-mining land uses, and require cooperation where two or more mines are adjacent.
5. The development assessment process consider and determine the cost and arrangements for post-mining rehabilitation prior to consent being granted.
6. The term "actively-mined" must be defined appropriately so that progressive rehabilitation is not delayed for land not actually subject to extraction or other use.
7. A new mechanism is necessary to address residual risks and costs, covering the cost of long-term environmental damage post-closure, overseen by the EPA.
8. We do not support the discussion paper's proposal to merely develop a framework to assess final voids. Final voids are not an acceptable final land "use" and we believe the general public would largely support this view.
9. We strongly support Life of Mine Plans being required for submission prior to decision about consent for a mining operation.
10. We support up front, specific completion criteria, developed in consultation with the public and informed by transparent monitoring and reporting.

11. We strongly recommend enforceable annual progressive rehabilitation targets in new life of mine plans.
12. We strongly support improving monitoring, assessment and reporting of rehabilitation performance and making these reports fully public.
13. Having reviewed the NSW financial assurance calculator and benchmarked it against industry best practice closure cost estimation, we do not accept assurances from the department that the current calculator will adequately assess the true cost of mine rehabilitation for a given site and enclose comments to this effect.

Reforms must align with public expectations

In return for the privilege of exploiting and profiting from Australia's non-renewable mineral resources, the public rightly expects that mined land be rehabilitated to an extremely high standard, preferably, to a state as productive, or more productive, than the pre-mining state.

At first glance, indeed, the public and the mining industry appear to share the same goal. The Minerals Councils' report on rehabilitation in the industry establishes that goal:

> *The Australian minerals industry recognises its responsibility as a temporary custodian of land to contribute to sustainable land use outcomes. It is the industry's goal that previously mined land is available for future economic activity, conservation or community use*.[1]

Public expectation reflects this goal. In 2016, The Australia Institute commissioned an opinion poll to gauge the Australian public's opinions in relation to mine rehabilitation. The polling found that 77 percent of respondents said that mine sites should be fully rehabilitated, described as:

> *Rehabilitation close to previous natural or farming condition - pits refilled to near original surface level, groundwater protected and original types of vegetation replanted.*

Less than 1 percent of people felt that it was acceptable for "pits [to] remain and fill with saline or acidic groundwater, dirt and rock piles remain in a fenced off area."[2]

The gap between what the regulatory framework requires and what the public expects is substantial and the aim of this reform process must be to close that gap so that the regulatory requirements on mining companies for rehabilitation transform all mined land back to close to its previous natural or farming condition, fills in all pits and protects water resources.

As the Department would be aware, there are already more than two dozen "final voids" approved to remain after mine closures. The Hunter Valley Operations expansion proposal currently seeking approval has just secured a recommendation to proceed from the Department of Planning despite the company proposing to increase the area of final void to be left behind by nearly 30% and increase the height of the overburden pile to 240 metres in places.

Over time, the gap between public expectations and industry performance is eroding the industry's social licence to operate.

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[1] Minerals Council of Australia. February 2016. *Mine Rehabilitation in the Australian Minerals Industry*. Available here: http://www.minerals.org.au/file_upload/files/reports/Mine_rehabilitation_in_the_Australian_minerals_industry_FINAL.pdf

[2] Public Opinion on Mine Site Rehabilitation, The Australia Institute, June 2016

The current review of mine rehabilitation in NSW is an opportunity to align the NSW regulatory framework with public expectations and perhaps the last chance to do so. It is a test of the industry's and the Government's commitment to implementing "world's best practice." The industry has publicly committed to best practice yet its performance consistently falls well short.

The public expects full and effective rehabilitation to be established as the standard all mine must meet – new and old – and for this to be paid for by the companies that have enjoyed support from mining communities for so many decades. This current process must facilitate this outcome by adopting the primary goal that all mine-affected land, water ways and aquifers should be rehabilitated to as good or better state of agricultural or ecological productivity as it was found.

Policy principles

While Lock the Gate supports the general direction of the proposed policy principles, they need to be more ambitious and specific and less equivocal.

As an opening statement that frames what follows, NSW should unambiguously commit to pursuing world's best practice mine rehabilitation and establish an overarching commitment that *all mine-affected land, water ways and aquifers should be rehabilitated to as good or better state of agricultural or ecological productivity as it was found.*

The following policy framework should be added to the principles outlined in the discussion paper;

1. Rehabilitation outcomes and proposed post-mining land uses must aim to eliminate sterilisation of land from productive use, whether for agriculture, ecology, cultural practice, housing or commerce.
2. Recognising that huge contribution that mining communities have made to New South Wales, the priority for rehabilitation should be to maximise social, economic and environmental benefits for the affected communities and the region.
3. Rehabilitation and closure proposals must meet or exceed world's best practice. At a minimum, this means:
    a. All disturbed areas must be rehabilitated and returned to a condition that is safe, stable, non-polluting and which delivers a positive environmental, social or economic legacy.
    b. Un-rehabilitated pit voids will be prohibited.
    c. All domains within a mine site must be rehabilitated and must support an agreed post-mining land use that is sustainable in the long-term.
    d. Rehabilitated land must be compatible with the surrounding landscape and landforms, including rehabilitation on adjacent mine sites. For areas where there are more than two mines within close proximity, a district plan must be developed to ensure the landscape productivity is maximized.
    e. Minimise disturbance to the hydrological system and prevent sediment or any other pollutants entering nearby streams and other waterways.
4. To provide certainty about rehabilitation and post-mining land use outcomes to both the proponent and the community, all development applications for new mining projects must include detailed and costed descriptions of proposed mine rehabilitation and closure activities and outcomes as well as a clear articulation of the risks. This information must;
    a. Be developed through a demonstrable process of engagement with affected communities and landholders;
    b. Identify suitable post-mining land uses that;

        i. Are supported by the affected communities and landholders
        ii. Are demonstrably compatible with surrounding landforms and land uses
        iii. Take neighbouring mine's rehabilitation outcomes into account
    c. Are fully informed by projected land use trends, regional needs and markets
    d. Detail rehabilitation objectives and completion criteria
    e. Include a 3D representation of the final land form
    f. Include binding targets based on milestones that ensure progressive rehabilitation is achieved in a specified timeframe based on the mine plan
    g. Specify likely residual risks and how these will be mitigated
    h. Include a detailed summary of costs associated with closure, rehabilitation and monitoring as well as the cost of managing residual risks.
5. A clear target must be adopted so that mined land must be progressively rehabilitated within 12 months of the resource being extracted and progressively rehabilitated unless the resource is being physically extracted or the area is being used for mine infrastructure
6. Information on mine rehabilitation including performance against milestones and associated targets must be made publicly available
7. The proponent is responsible for meeting all costs associated with their rehabilitation, closure and post-closure obligations.
8. Mined land will be considered to be rehabilitated when it is demonstrated that the final landform is safe, stable, non-polluting, able to sustain the approved post-mining land use and poses no unacceptable long-term risks.

Final voids

Lock the Gate does not support the discussion paper's proposal to develop a framework to assess final voids. It is nearly three years since the Planning Assessment Commission recommended the Department develop, as a matter of priority, a policy on final voids, noting that the size of the Warkworth was unacceptable and the high degree of public concern about the issue.

Several mining approvals that will leave behind voids have been approved since that time and there is still no policy.

A proposal at this stage merely to develop a framework for assessment is too little, too late.

Lock the Gate does not accept that final voids are an acceptable final land "use" and we believe the general public would largely support this view. The majority of final voids result in a substantial areas of the previously productive Hunter Valley and Namoi region will be being completely sterilised from any future use due to a variety of unacceptably high geotechnical, geochemical, public safety and environmental risks. The fact that these un-rehabilitated voids require fencing, bunding and signage to prevent public access is a clear admission that the void has no future use and in fact will remain a liability in perpetuity.

The Government must adopt a land form policy that does not assume final voids are an acceptable final land form. Any deviation from the overall goal, shared by industry, that land will be returned to productive use, should be subjected to rigorous scrutiny and skepticism. The Department must make clear that merely citing profit-maximisation as a justification for final voids is no longer acceptable. The new framework must ensure that if mining companies wish to exploit the publicly owned resources of the Hunter Valley and other regions, not just in taking coal but in removing or despoiling soils, vegetation and water, they must do so within the strict requirement that the mine site is rehabilitated to a standard that ensures an agreed post-mining land use is achieved and that

residual impacts to land and water resources are ideally eliminated or negligible. This is clearly not the case when large voids are left behind.

The experience in the United States with the *Surface Mining Control and Reclamation Act* illustrates that the mining industry can adapt to new operating parameters designed to protect the environment and the public interest while not compromising industry profitability. Passed in 1977 in response to the US coal sectors massive impacts on the environment, the legislation rejected final voids and ex-situ waste dumps and tailings dams and directed the coal industry to;

1. restore the approximate original contour of the land by backfilling, grading, and compacting;
2. minimise disturbances to the hydrologic system and preventing additional contributions of suspended solids (sediments from erosion) to nearby streams and other water bodies;
3. restore the land as soon as practicable after the resource has been extracted, and as the mining operation moves forward; and
4. establish a permanent vegetative cover in the affected area.[3]

While we accept that not all post-mining land can be returned to its former condition, this should not be an excuse to allow companies to leave behind degraded landscapes that include pit voids, waste dumps and above ground tailings dams. All mined land must be rehabilitated, including final voids, to the point where it is capable of sustaining a productive post-mining land use and long-term residual risks are mitigated to a negligible, acceptable level.

The NSW draft policy refers to post-mining land uses that maximise the beneficial social, economic and environmental outcomes. In order to deliver certainty to the community and industry the NSW Government should drop the proposal to assess final voids and instead craft and adopt a Final Landform and Landuse Policy. As a starting point we believe the following goals reflect the public's expectations;

1. All mining domains be rehabilitated, pits backfilled to near original surface level using waste rock material and tailings and ground and surface water resources are protected,
2. Where pre-mining land use was a native ecosystem, reinstate a functioning ecosystem as similar as possible to the original vegetation assemblage,
3. Where pre-mining land use was agriculture, no degradation of agricultural productivity as a result of mining will be permitted. No down grading of cropping/horticultural land to grazing and no loss of original grazing capacity.
4. Ecological restoration of former agricultural land is acceptable if strategically suitable.

The ability to "sustain a post-mining land use," as opposed to areas being fenced-off must be the core goal of any rehabilitation strategy. Lock the Gate is not alone in advocating this goal. The Minerals Council of Australia has committed the industry to ensuring mined land is returned to a usable state;

> *The minerals industry recognises that while some previously mined areas are rehabilitated to pre-existing condition or better, other mined areas result in substantial transformation of the landscape. It is the minerals industry's goal to ensure that this land is available for subsequent economic activities, conservation or community use.*[4]

[3] Adapted from https://sites.google.com/site/stripmininghandbook/a-brief-review-of-smcra
[4] http://www.minerals.org.au/file_upload/files/resources/MCA_Stewardship_Policy_2012.pdf

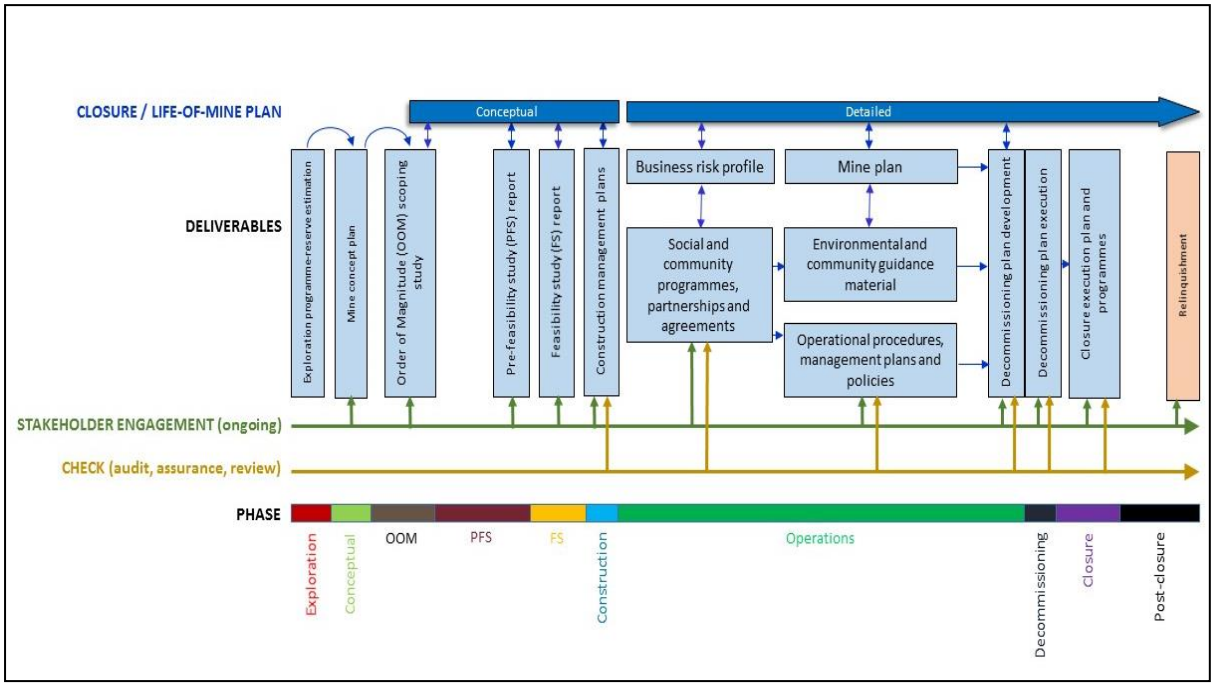
Proposal 3: Rehabilitation and closure in the early stages of mine planning

Lock the Gate strongly supports mandating the submission of Life of Mine Plans as a precondition of a mine's development approval and as a replacement of the current Mine Operation Plans. Industry leading practice planning should form the basis of the NSW Government's requirements in this area. Life of Mine plans should include a detailed mine closure plan which in turn should specify a clear progressive rehabilitation schedule including qualitative and quantitative targets.

The Minerals Council of Australia shares our support for life of mine planning and progressive rehabilitation;

> *Responsible environmental management over the life of a mining operation is essential for successful rehabilitation. Companies are careful to avoid disturbing land unnecessarily and to minimise the footprint of operations. This reduces the scale and complexity of rehabilitation requirements, and lowers the cost to companies. Furthermore, rehabilitation is undertaken not only at the end of a mine's life, but progressively during the mining process. This enables companies to meet rehabilitation obligations and minimise risk over the life of the operation*[5]

The schematic representation below represents where mine closure and rehabilitation fits into life of mine plans. Such plans are crucial to establish the context and upfront information necessary to inform binding progressive rehabilitation targets that suit the mine in question.



Lock the Gate has produced a detailed guidance based on industry leading practice mine closure planning which we believe is an appropriate framework for the rehabilitation component of life of mine plans and a guide for the type of information that must be provided by the proponent as part

[5] Mine rehabilitation in the Australian minerals industry, MCA, 2016 page 4

of the development application process. As stated above, the life of mine plans should replace the current MoPs and be exhibited and adopted as part of the development consent process.

The Lock the Gate Guidance is attached to this submission. See Appendix A.

The International Council on Metals and Mining's "Planning for Integrated Mine Closure Toolkit" advocates stakeholder engagement in the development of rehabilitation and post-closure goals. It argues that, "Effective closure planning involves bringing together the views, concerns, aspirations, efforts and knowledge" of stakeholders so that outcomes benefit both the company and the community. The toolkit recommends incorporating closure planning into early stages of development and collating the views of communities an NGOs at that stage. It stresses that "the process of engagement with internal and external stakeholder should be undertaken thrughout the life cycle of the operation"

Engaging the community about acceptable post-mining landforms and land uses is a key element of successful mine closure and the protection of the industry's social licence. The current practice of approving post-closure landforms that deliver highly degraded landscapes characterised by pit voids, out of pit waste dumps and tailings dams, and which delivers degraded landscapes and on-going liabilities will inevitably lead to further erosion of the industry's social licence.

The experience of community members engaging with the State Significant Development assessment process is very poor and is characterised by frustration, conflict and opacity.

Life of mine plans must reflect world's best practice and mandate broad public and stakeholder engagement at all stages of mine planning, including agreement on the final land use and land form. This engagement needs to continue throughout the life of the mine in order to deliver the lowest impact, highest value environmental and socio-economic outcome and in doing so also deliver the lowest risk for shareholders.

Proposal 4: Ensuring rehabilitation requirements are clear and enforceable.

Lock the Gate agrees that regulators, mining companies and the public need clarity and certainty about completion criteria for mine rehabilitation. Developing completion criteria guidance is essential. Consistent with industry leading practice any guidance relating to defining clear and enforceable completion criteria should include, as a minimum, the following elements;

1. A detailed description of the agreed final landform and final land use by site domain. These should be agreed to by all stakeholders – the company, the regulator, the affected communities and other relevant stakeholders including Traditional Owners.
2. A broad set of attainable outcomes. This should be informed by reference sites, the nature of the mine's disturbance, physical and technical limitations, independent expert opinion from a variety of relevant disciplines and include public input.
3. Develop comprehensive monitoring and research programmes. There is no single formula governing site specific rehabilitation. It is an iterative process but it must be informed by state of the art monitoring and a comprehensive research programme that fills identified knowledge gaps. This will drive continuous improvement and facilitate "learning by doing."
4. Detailed completion criteria informed by site-specific observation. Setting detailed completion criteria must involve independent experts and be informed by monitoring and research. Performance criteria at various stages in the rehabilitation process will also help to inform what is likely to be achieved in the longer-term and provide a compliance framework.

5. Unambiguous linking of the monitoring programme to the research programme so that over time knowledge and understanding is built up on evidence that informs an attainable set of completion criteria.
6. Commencement of progressive rehabilitation during the commissioning stage.
7. Comprehensive, open and transparent reporting plus maintaining communication with the public throughout the process.
8. Consideration should be given to mandating the creation of an independent reference panel at each site or covering a number of sites in a particular region to build confidence in the rehabilitation process.

Lock the Gate strongly supports including targets and associated actions in new life of mine plans. Progressive rehabilitation is a key risk management strategy in regards to protecting affected communities, the NSW taxpayer and the environment.

Mandated targets will overcome the single biggest institutional barrier holding back progressive rehabilitation - management's narrow focus on maximising short-term cashflow.

While all major mining companies publicly support maximising progressive rehabilitation, the reality is starkly different. Site and senior corporate manager's performance bonus structures focus on two main metrics – cost reduction and production volumes. This short-term focus on cashflow leaves little room for the allocation of personnel, equipment and budget to drive and maximise progressive rehabilitation.

The evidence attests that the industry is incapable of regulating itself to achieve the necessary progressive rehabilitation to protect tax payers, the environment and the long-term interests of shareholders. Progressive rehabilitation rates for coal mining in the Hunter Valley stand at 33.6%[6].

Faced with this situation and assuming the Government is committed to protecting the environment and the interests of the NSW taxpayer, this review has little choice but to support the introduction of mandated progressive rehabilitation targets and ratios.

Proposal 5: Ensure that regulatory processes that occur once a mine has been approved are transparent and deliver consistent rehabilitation outcomes

To deliver consistent rehabilitation outcomes, rehabilitation and closure must be fully integrated into Life of Mine Plans. Further the development approvals and consent processes must include the submission of these Plans and include mandated progressive rehabilitation targets. These reforms will go a long way to delivering consistent rehabilitation outcomes and improving public confidence.

Lock the Gate strongly supports improving monitoring, assessment and reporting of rehabilitation performance and making these reports fully public. Greater transparency is a key driver of improving performance.

Leading companies have their own internal reporting processes that gather the data they include in their annual sustainability reports, reports to various global performance initiatives such as the Global Reporting Initiative, and other requirements such as greenhouse gas emission reporting. This data also informs head office of site performance against a raft of internal targets and is used to

[6] Report of targeted Compliance program – Financial assurance for Queensland coal mines (TCP15-009), Queensland Department of Environment and Heritage Protection, 29 January 2016.

determine site management bonuses amongst other things. This data is collected annually. There is no reason why the NSW regulator cannot request that this site by site rehabilitation performance be reported publicly.

It is essential that mines develop a set of quality metrics against which their progress toward completion criteria can be measured. In 2012 Rio Tinto developed a comprehensive technical guidance – Supplementary Technical Manual: Rehabilitation Quality Measurement, April 2012 – to guide the development of rehabilitation quality measurement programmes. This is another example of industry best practice that could be adopted by the NSW Government as a regulatory template to ensure both the quantity and quality of rehabilitation is documented as part of the annual reporting programme.

Annual reports should include as a minimum the following;

- Area disturbed annually and cumulatively – fully independently verified
- Area where rehabilitation has commenced by domain annually and cumulatively
- Rehabilitation goals and completion criteria by domain
- Rehabilitation performance against targets by domain
- Rehabilitation quality measurement plan (as an attachment to the report)
- Establishment criteria by domain
- Interim completion criteria and milestones by domain
- Rehabilitation performance against each of these criteria by domain
- Auditing and independent verification process

These reports should be published on both the companies and the Department's websites.

Reports should be published annually as leading companies collect these data annually as part of their internal site performance surveys. Therefore there should be no issue with companies providing this data publicly on an annual basis.

Other Priority Reforms

Addressing Mines in Care and Maintenance

There is strong evidence to suggest that mining companies are utilising care and maintenance to avoid fulfilling their mine rehabilitation, closure and lease relinquishment obligations. In many instances mines placed in care and maintenance have significant rehabilitation liabilities due to the industry's consistently poor levels of progressive rehabilitation during the operational life of the mine. Further at many sites where rehabilitation has been carried out, inadequate final landform design and poor quality rehabilitation techniques have resulted in structural failures and on-going problems which require extensive and expensive reworking.

The care and maintenance loophole results in the following negative impacts;

1. Reduced employment: Failure to invest in full closure, rehabilitation and lease relinquishment costs local jobs.
2. Continuing environmental and public safety impacts: Failure to close and fully rehabilitate mines means in many instances that they continue to have environmental impacts particularly where acid mine drainage, salinity and contaminants are present. Retention of large open voids including those containing large amounts of contaminated and hyper-salinated water pose a risk to human health and wildlife. Other engineered structures such

as redundant tailings dams and waste rock dumps are prone to failure in the short-term if poorly designed and constructed.

3. Opportunity cost: Affected communities suffer economically both due to loss of employment as well as the potential of rehabilitated sites to deliver some economic value locally. While the standard of rehabilitation in NSW is relatively poor, leading practice closure and rehabilitation can deliver better outcomes with final land forms and land uses creating some value for local communities.

Closing the care and maintenance loophole must involve setting a clear timeframe and an assessment process so that only legitimate care and maintenance is permitted. As a matter of principle, there should be a prohibition on mines be placed in care and maintenance unless there is evidence based exceptional circumstances.

Companies applying to have sites placed in care and maintenance should be required to;

- Justify the action on the site's financial viability based on an independent assessment of the ore body status, production costs, additional investment required against accepted projected commodity prices
- Continue to progressively rehabilitate the site to maximise the area of rehabilitation and ensure that there are zero discharges from all tailings dams, voids and waste rock dumps
- Accept mandated directions from the relevant department as to the scale of progressive rehabilitation that must be undertaken during care and maintenance
- Maintain maintenance and monitoring programmes and report results publicly
- Submit an annual status report a) justifying the status of the site should care and maintenance be extended and b) reporting on progressive rehabilitation, maintenance and monitoring
- Every two years be subject to an independent site economic status that will determine whether or not the site should remain in care and maintenance or whether it should be permanently closed and rehabilitated.

While it is acknowledged that in a minority of cases placing mines in care and maintenance is legitimate due to a temporary decline in a commodities price, in the majority of cases, mines in care and maintenance remain in this state in spite of material, in some cases record rises in commodity prices.

Residual Risk – Measurement and Management

The NSW Government needs to define and clarify the relinquishment process. This was a key finding in the recent Audit Office report. Assessing whether or not a mine site is "fit" for relinquishment must be a risk-based process. It must ensure the environment, affected communities and the NSW tax payer are protected requires setting a residual risk payment tied to the level of long-term risk.

Enshrining a residual risk assessment process and incorporating a residual risk payment throughout the life of the mine is potentially a strong driver for improving industry performance. If a company leaves behind a high risk site including toxic, hyper-salinating voids, poorly designed dumps and tailings dams then its residual risk payment will be materially high and liability could be in perpetuity. A low risk final landform will accrue less of a liability. The cost implications of a high residual risk could be major.

Queensland is also considering imposing a residual risk premium during the life of the mine (in addition to financial assurance) that reflects the residual risk of the proposed final landform which

will act as an on-going an incentive to reduce the risk throughout the life of the mine by delivering a lower risk option/lower premium. The premium will also cover the Government's residual risk liability (similar to financial assurance) in the event of a default prior to planned closure of the mine.

The level of residual risk and the determination of the price of that risk should be determined by a process that is independent and rigourous.

We propose an expert panel comprised of technical experts who will determine the environmental risks, consequences, frequency and likelihood of impacts/events and their costs as well as acceptable thresholds, timeframes and the cost of monitoring, maintenance and reporting.

The EPA should also retain an independent risk advisor, focused on calculation of costs, cash inflows and outflows. The role will provide technical support on risk assessment and pricing, quantitative analysis to estimate likely impacts and costs as well as options analyses for mitigation strategies. It will also act as a bridge between the insurance sector, the expert panel and the responsible entity within Government managing the residual risk process.

The EPA should oversee the process and take care of policy and payment regimes. The EPA will consider the expert panel's advice and consult with Treasury, other departments and the mining company in determining the final residual risk assessment and payment.

The residual risk assessment will cover public liability, rebuild and rectification of land forms, sudden catastrophic events and the risk of long-term environmental harm. While Queensland is yet to decide the final process and framework, analysis and research conducted to date by State Treasury would provide the NSW Government with a robust framework to deal with the considerable challenge of managing residual risks from mining operations across various commodities.

Reviewing the NSW Financial Assurance Calculator

Ensuring the State has access to adequate financial resources to facilitate the rehabilitation of a site in the event the company defaults is an essential component of any reform package. Lock the Gate has reviewed the NSW financial assurance calculator and benchmarked it against industry best practice closure cost estimation. We do not accept assurances from the department that the current calculator will adequately assess the true cost of mine rehabilitation for a given site.

The results of this review indicate that the NSW FA calculator has a number of significant flaws including;

- No independent verification of the measurement of disturbed area
- No 'basis of estimate' to provide transparency for the rates and values in the calculator
- Absence of a range of indirect project management costs
- No accounting for EPCM costs
- No accounting for owner's costs
- No accounting for cultural and socio-economic obligations
- An underestimation of the timeframe and costs of long-term monitoring
- A single line item for contingency that fails to recognise the level of definition for the particular closure plan

Notably, the primary focus on the "physicals" of mine site rehabilitation in the NSW calculator and guidelines neglects a range of project management costs that internal mining industry calculators

include as a matter of course. If the financial assurance were to be called on by Government to undertake rehabilitation after a company reneges, under the current arrangements, the public would foot the bill for project managing the work.

It is likely that that the addition of all these costs to the estimate may result on an increase in the calculated financial assurance required by as much as 100% or more in specific instances. Certainly, this analysis of the NSW financial assurance calculator suggests that it will be leading to requirements that are inadequate to cover the full cost of mine rehabilitation.

As a result, NSW taxpayers are likely to be exposed to a substantial financial liability.

Verification of the disturbed area

The basis of the closure cost estimate and the financial assurance is dependent on the accuracy of the measurement of the area disturbed by mining. There is no requirement in the NSW FA calculator or its guidance that specifies the method and verification for defining disturbance types and area disturbed (analogous to that information provided by an appropriately qualified and accredited Quantity Surveyor in other sectors). Rather, this information is provided by the lease holder and is invariably accepted by the State at face value. These data (*ie* type of disturbance and areas thereof) are fundamental to the FA calculation.

Verification of rates and values

The NSW calculator focuses almost exclusively on direct hourly rates and unit costs for completing the physical elements of site rehabilitation. The "physicals" of mine site rehabilitation are obviously important for determining costs as pushing materials to reconfigure the physical landscape constitutes a high percentage of the overall cost of mine site rehabilitation. However the "physicals" are not the whole story.

Within the calculation of the direct costs of pushing bulk earth material, deconstruction and demolition there is limited detail provided for the basis for rates articulated. Industry best practice requires a "basis of estimate" document that articulates the basis of all the rates and values used in the calculator. In the case of the NSW calculator no such "basis of estimate" exists.

Absence of indirect costs

It appears that the NSW calculator does not account for a range of indirect costs that are necessary for the work to be completed by contractors including;

- Site establishment and operation of temporary site facilities (offices, ablutions, crib sheds, storage containers etc.) and utilities
- Construction small tools and consumables (hand tools, engineering tools, grinding discs, welding consumables, safety equipment, medical supplies, fuels and lube etc.)
- Contractor's demolition, remediation and rehabilitation related equipment (compressors, generators, welding machines, cranes, trucks scaffolding, lighting equipment etc.)
- Manual indirect resources (maintenance crews, storeman, store forklift drivers, bus drivers, cleaners, cooks, security etc.)
- Site office operation (IT & communications, office, crib and ablution fit out, supplies and consumables, waste management, personnel vehicles etc.)
- Accommodation and subsistence (camp/hotel/caravan park, messing/living away from home allowance/per diems)
- Overheads (Insurances, head office overheads and support, licenses and permits etc.)

There are a range of indirect costs that the calculator does not account for which are not provided for by the contractor including;

- Construction Facilities
- Construction Support
- Construction Equipment & Consumables
- Construction Camps
- Freight
- Project Expenses

While a number of these line items may appear inconsequential, aggregated over a number of years, these costs can mount and will become material. In the event that the NSW Government is forced to manage a mine's rehabilitation, these indirect costs will need to be met to ensure a successful outcome.

EPCM Costs

Engineering, procurement, and construction management (**EPCM**) is a common form of contracting arrangement for large projects within the infrastructure, mining, resources and energy industries. In an EPCM arrangement, the client selects a head contractor who manages the whole project on behalf of the client. EPCM costs related to the engineering design of the project, the procurement of physical items, the appointment and supervision of contractors, and to project and site management associated with project execution activities.

No provision is made for EPCM costs in the NSW calculator.

Owners Costs

These are costs which relate specifically to the company and which have not been included elsewhere in the estimate. The NSW calculator does not include these costs.

This would generally include:

- Owner's Management Team - costs to include salaries benefits, travel, accommodation office rental, communication and running costs;
- Marketing and sales costs;
- Council and local government rates;
- Land purchase or leasing costs, including mining leases and tenement holding costs, office accommodation and lease rentals;
- Royalties and fees, including mining, management, technology and legal fees;
- Insurances including construction insurance costs, motor vehicle insurance. Public and professional liability;
- Quality assurance, quality control and verification of engineering plans and works
- Future Study Costs – this is the cost of all future studies, including test-work, financial evaluations / modelling, environmental and native title impact. These should be included in a specific section under Owner's cost within the estimate.

Community and Heritage Obligations

Many mining operations particularly in remote parts of the state have long standing and complex arrangements with Traditional Owners and other stakeholders in regards to heritage, community development and skills and employment. This may involve the administration of trust funds and specific programme funding streams.

Winding up these programmes while meeting stakeholder expectations can be time consuming and costly depending on the situation. Generally these programmes are not a huge cost – although some can be significant – but the cost in regards to personnel time, legal costs, travel and sundries should not be ignored.

Many of these commitments are legally binding and run over decades. The NSW calculator does not make any provision for these obligations.

Contingency

The inclusion of contingency is standard practice in Australia in regards to any large engineering project. Indeed contingency is standard practice in most large scale state funded engineering works. "Contingency is an integral component of the overall risk assessment and budget setting process prior to an investment decision and a key aspect of sound project management across the project lifecycle[7]. Contingency is a financial reserve included in the project's estimate to offset uncertain or unpredictable factors relating to the delivery of project objectives. "In terms of managing risk on a project, it can take many forms - it may be a time allowance in the program of works for delay or a cost allowance in the project cost estimate to account for the residual risk. The amount of the contingency is reassessed at project review points to reflect current knowledge and level of uncertainty of the project, with a view to forecasting the most likely outcome."[8] This includes, but is not limited to, planning and estimating errors or omissions, price fluctuations, design development and within scope changes, variations in market and environmental conditions. Contingency is a standard accounting practice applied to most large scale engineering and construction projects. Contingency is a real cost and would be expected to be spent in part as the project proceeds.

The magnitude of the contingency applied to an estimate is determined from the analysis of the sensitivity or potential variation of key estimate parameters (e.g. rates, quantities, tasks, etc.).

For conceptual and projects moving into pre-feasibility level closure and rehabilitation plans a less prescriptive, (i.e. more subjective), approach is generally adopted as there is less detail within the estimate on which an appropriate analysis can be based.

For mature closure and rehabilitation plans a more objective approach to the establishment of contingency is required. This would normally include a formal range or sensitivity analysis of the estimate.

Study Level	Project Definition	Accuracy	Expected Contingency Range
Concept/Scoping	1% to 15% Preliminary economic and technical Investigation. Project screening. Comparison of alternatives, configurations and options	+/-30% to +/-40%	25%-40%

[7] Infrastructure NSW. Contingency Management Guidebook - Guidelines for optimising capital investment funding, February 2014, page 1

[8] Project Cost Estimating Manual 6th Edition, Queensland Government, Department of Transport and Main Roads, September 2015, S10.2 page 74

Pre-Feasibility	10% to 40% Economic Feasibility of one or more chosen options.	+/- 20% to +/- 30%	15%-25%
Feasibility	30% to 75% Project Approval and basis of approving project finance.	+/-10% to +/-15%	10%-15%

The NSW calculator includes a set contingency of 10% which assumes the closure plan is at feasibility level, meaning the plan is extremely detailed and has a high degree of accuracy. The calculator displays no capacity to assess the maturity of the closure plan on which the cost estimate is based. The assumption of a 10% across the board contingency devalues the notion of a contingency which should reflect the level of confidence that the plan has effectively dealt with in relation to the unknowns and the associated risks. In our experience, NSW mine closure plans where they exist – for example, the Drayton mine – are more likely to be at the scoping to pre-feasibility levels meaning the contingency should be between 40% and 15%.

Risk

Risk allowances should be identified and included as a separate element in the financial assurance estimate. Risk allowances are identified via a review of the site's major risk categories and risk items and mitigation strategies identified with the cost of mitigation and residual risk status analysed.

Risk allowances normally cover events such as:

- Strikes / industrial disputes / action;
- Abnormal weather conditions or events;
- Exchange rate variations;
- Market fluctuations or inflation;
- Major scope changes
- Project technical, business or political risk.

The NSW calculator does not make any provision for risk. In many cases this could be material adding 15% or more to the cost of the plan depending on the attributes and situation of the mine.

Monitoring

Monitoring of revegetation, biodiversity, landform stability, surface and ground water quality among other things will be necessary. The NSW calculator assumes a monitoring period of 5 years. This is insufficient time to ensure a constructed landform is safe, stable and sustainable. Many mines will have to undertake groundwater monitoring for many years after mining has ceased, given the intention to leave final voids that will affect groundwater for decades or even centuries. Others, like the Mount Thorley Warkworth mine, have committed to replanting rehabilitated mine areas with endangered ecological communities, which will require years of monitoring and management.

In Queensland for example, the Government has required license holders to prepare a Post Closure Management Plan for a period of least 30 years following final production (the implication being up to 30 years of monitoring data being collected and managed). In part this is to ensure the landform is subject to a range of weather conditions that give confidence that the revegetation and landforms are robust and sustainable. A 5 year window does not facilitate this. Climate change may require a further review of monitoring and management timeframes in NSW.

According to the FA calculator monitoring can cost several million dollars per year (*eg* 5% of a $100M rehabilitation liability equates to $5M). Aggregated over 10, 20 or 30 years these costs can easily exceed $150M in specific cases for large scale, large impact open cut mines and associated mineral processing facilities.