



Independent Expert Panel for Mining in the Catchment

NSW Minerals Council Submission – March 2019

1 Introduction

The NSW Minerals Council (NSWMC) is the peak industry association representing the NSW minerals industry. NSWMC has more than 90 members including mineral explorers, mining companies and associated service providers. Our members include the companies that operate the underground coal mines in the Southern Coalfield.

The *Initial report on specific mining activities at the Metropolitan and Dendrobium coal mines* (Initial Report) prepared by the Independent Expert Panel for Mining in the Catchment (the Panel) synthesises information from the wide range of studies that have been undertaken on mining in the catchment. The Initial Report highlights the significant progress that has been made, and continues to be made, to improve the understanding and management of mining in the catchment.

The Initial Report covers technical issues in significant detail. The two companies that are the subject of the Initial Report will be responding to the technical issues specific to their mines.

This submission has been prepared in consultation with our member companies and is focused more on strategic issues, together with a limited number of technical issues for the Panel to consider as it prepares its final report. The submission also considers the socio-economic benefits of the mining industry for the Illawarra region, which must be accounted for in triple-bottom line decision making.

1.1 Environmental considerations are paramount for mining operations

The industry is acutely aware of the sensitivity and value of the drinking water catchments.

NSWMC and its members agree with the Panel's finding that the industry uses best practice modelling methods with improved accuracy and predictive capacity in order to mitigate, monitor and manage potential impacts on surface and groundwater in the catchment. The Panel also recognises that the mining industry is engaging technical experts (with expertise in surface water, groundwater and subsidence) to develop these models and to conduct robust analysis of monitoring results in order to achieve improved outcomes.

The above measures reflect the importance that the industry places on minimising its environmental impacts and demonstrates how the industry continues to proactively respond to community expectations on this issue.

1.2 The impacts of mining are minor in the context of the broader catchment

While the potential for mining to cause impacts within the special areas requires special attention, the localised impacts that have been observed need to be considered objectively and in the context of the broader catchment.

Every day, SydneyWater supplies 1.5 billion litres of drinking water to customers¹. The Panel's estimate of average surface water diversion of 3 megalitres per day at the Dendrobium Mine (which the mine operator believes is at the upper end of reasonable estimates) equates to just 0.2% of this volume. By way of comparison, SydneyWater loses 130 megalitres per day from leaks in water pipelines². In its reasons for approval of the Management Plan for Dendrobium's Longwalls 15 and 16, the Department of Planning and Environment, following advice from its own independent water expert, considered that *"a loss of up to 830ML of rainfall per year into the mine is negligible in comparison to the total capacity of the catchment dams (0.03%) and annual losses from evaporation and environmental flows (0.19%)"*³.

NSWMC and its members are not questioning the need for stringent mine design and management measures to minimise the potential diversion of surface water in the catchment and supports further work to more accurately quantify the cumulative diversion of surface water. However, as the Panel acknowledges, *"there remains no strong evidence that cracking of watercourse beds leads to significant losses of water at catchment scales relevant for water supplies"*⁴. (p97)

1.3 The coal resources of the Southern Coalfield are of strategic economic importance to NSW and the Illawarra economy

Below the surface of the catchments are the premier hard coking coal resources of NSW. Hard coking coal is used to make coke, which along with iron ore is a key ingredient in the production of steel. There is currently no commercially viable alternative to the use of hard coking coal in primary steel production.

The Southern Coalfield is the only source of hard coking coal in NSW. As well as providing hundreds of millions of dollars in export income to the Illawarra region each year, the mines of the Southern Coalfield supply the coking coal that is crucial to the ongoing operation of the Port Kembla Steelworks.

Over the last three financial years, mines in the Southern Coalfield have on average produced 10 million tonnes of saleable coal for both domestic and international markets and over that time have paid \$316 million in royalties to the state government, on top of other state taxes, fees and charges.

NSWMC recently completed its 2017-18 NSW Mining Industry Expenditure Impact Survey⁵. Of the companies operating in the Illawarra region, South32, Peabody and Hume Coal responded to the survey. Total direct expenditure on wages and suppliers in the Illawarra totalled \$667 million, with payments going to 690 local businesses and 1,500 direct employees. This expenditure was modelled to deliver \$1.6 billion in value added, or 7.9% of the Illawarra's Gross Regional Product and supported more than 12,000 direct and indirect jobs in the region. Note that Coal Services⁶ reports the total direct employment in mines in the Southern Coalfield as being more than 2,500.

¹ <https://www.sydneywater.com.au/SW/water-the-environment/how-we-manage-sydney-s-water/water-network/index.htm>

² http://www.sydneywater.com.au/web/groups/publicwebcontent/documents/document/zgrf/mdq3/-edisp/dd_047419.pdf

³ <https://majorprojects.accelo.com/public/74e54ea1ec7154b135724f761ec1b2b4/02.%20Reasons%20for%20Approval%20Longwalls%2014%20and%2015.pdf>

⁴ p97

⁵ http://www.nswmining.com.au/NSWMining/media/NSW-Mining/Attachments/Economic%20Survey%202017-18/NSW-Mining-Industry-Expenditure-Impact-Survey-2017-18-Final_1.pdf

⁶ <https://www.coalservices.com.au/>

The Illawarra region has history steeped in coal mining and as such mining services and suppliers have established themselves in the Illawarra. Their viability is reliant upon a critical mass of coal production to sustain these businesses and the people they employ.

It is clear from the combination of the rarity of the Southern Coalfield's hard coking coal resources, their proximity to the Port Kembla and the steelworks, and the economic benefits delivered by mining in the Southern Coalfield that these coal resources are a strategic economic asset for the State.

1.4 Government policy should balance catchment protection with responsible extraction of the Southern Coalfield's strategically important coal resources

While some groups are advocating for a halt to mining in the catchments, this would forgo billions of dollars in economic activity and the loss of thousands of jobs across the region both in the mines themselves and in the hundreds of supplier businesses, as well as having major ramifications for the Port Kembla steelworks and the Port Kembla Coal Terminal. These significant costs to the broader economy would only deliver negligible benefits to the overall water supply.

Government policy in this region should have the dual objectives of ensuring that the integrity of the overall catchment is protected, while at the same time continuing the responsible extraction of the State's strategically important hard coking coal resources. The ability to achieve these dual objectives is demonstrated by the more than 100 year history of sustainable mining in the catchment.

2 Issues associated with the regulatory framework and approvals process

2.1 The current 'incremental approval' approach creates unacceptable risks to the continuity of mining

The Panel endorses DPE's approach of *"approving longwall panels at Dendrobium and Metropolitan mines on an incremental basis in the light of existing and emerging information and knowledge gaps that have the potential to jeopardise compliance with performance measures"*.

While the general approach of reviewing new information and granting secondary approvals in stages over the life of a mine is reasonable in appropriate circumstances, the current approach to incremental approvals creates significant risks for the continuity of mining operations.

The industry acknowledges that the primary and secondary approval process must be rigorous. However, it is also critical that a pragmatic, timely and transparent assessment and approval process is adopted by DPE to ensure that the industry has adequate lead time to justify significant investments on mining capital and for employment certainty for workforces across the region.

There are examples where final approvals have only been granted a matter of days or weeks before longwall operations would otherwise need to cease. There are critical time factors involved in making mine planning and operational decisions that must be considered and receiving approvals at such a late stage creates significant uncertainty for mining operations.

Changes to the approach for incremental approvals are required so that companies and regulators are not in a continual cycle of short term approvals that are only granted immediately before they are required.

2.2 The assessment function of the Panel requires clearer structure and transparency

The Panel is a relatively new creation and adds to a range of other agencies and experts that have a role in the assessment process such as the Commonwealth Independent Expert Scientific Committee (IESC), independent experts commissioned by DPE, the Independent Planning Commission and the Woronora Reservoir Impact Strategy Panel.

The industry acknowledges the importance of robust independent peer review in the assessment process for mining projects in the catchment. However, it is important that this is undertaken in a transparent and efficient manner.

To date, how the Panel undertakes its assessment function has been poorly defined, as has the scope of the Panel's reviews and how this integrates with other reviews that are undertaken in the assessment process.

It is important that the Government defines the precise role of the Panel in the assessment process, how this role fits within the broader structure of expert input already a part of the extensive environmental assessment process, and takes steps to improve transparency around the timing and timeframe for advice that is requested in order to avoid any unnecessary duplication in the process.

2.3 Water licensing arrangements must be addressed by the Government

The Panel recommends that *“Government should verify that sufficient entitlements are retained by Dendrobium and Metropolitan mines to cover surface water losses resulting from mining-induced effects”*.

This is an issue that some mines have approached the Government about with the intention of resolving following the introduction of s60I of the *Water Management Act 2000*, but limited progress has been achieved. The industry agrees that resolving this issue should be a focus for the Government, since the current policy framework - in which there are areas where surface water entitlements are fully allocated to water management authorities or utilities - is a factor limiting progress.

NSWMC will be taking up this issue further with the relevant agencies.

2.4 The current swamp offset policy is impractical and requires amendments to deliver a workable offset framework

While not considered in the Panel's Initial Report, the offsetting process for potential impacts on swamps is of concern to the industry.

The NSW Biodiversity Offsets Policy (BOP) commenced on 1 October 2014. The policy applies to major projects assessed under the Framework for Biodiversity Assessment (FBA) and includes the *Addendum to NSW Biodiversity Offsets Policy for Major Projects: Upland swamps impacted by longwall mining subsidence*, which was released in 2016.

While to date no projects have applied the swamp offset policy, the application of the offset policy is likely to be impractical. The key issues include:

- The majority of upland swamps occur within existing reserves or protected catchment lands and as such they are not expected to be available for use as offsets to impacts.
- The policy is extremely conservative and assumes total loss of the entire swamp based on changes to the groundwater system within swamps. History shows that this is not a typical response of the vegetation in upland swamps to subsidence and is therefore an unreasonable assumption.

The combination of the lack of swamps on private land, together with the high offset ratios driven by the assumption of entire losses of swamps, could make it difficult to secure offset arrangements that comply with the policy. It is essential that the Government reviews the way that the BOP is intended to operate in practice and develops an alternative approach that more realistically reflects the potential impacts on swamps and practical ways in which these impacts can be offset.

3 Subsidence, water and swamp issues

3.1 The industry continues to improve its approach to subsidence, water and ecological impact assessment and management

While the Panel outlines ways in which modelling, monitoring, data analysis and management could be improved, it also highlights the significant progress made by the industry to improve these aspects over the last decade. This process of improvement will continue. The Initial Report has made a range of suggestions that the industry will, or already has, taken on board.

Some of the improvements recognised by the Panel include:

- Major efforts to employ up-to-date 3 dimensional groundwater models
- Advances in the knowledge bases underpinning subsidence, groundwater and surface water
- The extensive network of monitoring sites.

Some areas where mines are already applying recommendations outlined in the Initial Report include:

- Comprehensive 3-dimensional numeric groundwater models have been developed for all mines in the Southern Coalfield
- Extensive over goaf drilling and fracture characterisation has been completed
- Groundwater models use site specific height of fracture data and where data is limited the conservative Tammetta equation is used
- Surface and groundwater models are peer reviewed prior to submission to DPE
- Management Plan TARPs are currently being reviewed with DPE in line with Panel recommendations
- A comprehensive assessment of the effects of basal shear and faulting on surface and groundwater impacts is underway
- The valley closure impact model is subject to constant review and updated as new data becomes available.

The industry invests significant resources in ongoing research in the catchment, partnering with universities and other research organisations. For example, Dendrobium Mine is investing \$3.5 million on research which is fundamental to our understanding of the Special Areas, including research into groundwater, surface water and ecology.

Some of the findings in the Initial Report would appear to be incorrect, such as the criticisms of Trigger Action Response Plans (TARPs) for swamps. The swamp TARPs include triggers associated with piezometer monitoring and therefore provide immediate feedback on the response to mining. The Panel's conclusion that "*TARPs do not reflect the groundwater-dependence of the upland swamp ecosystems*" is incorrect. NSWMC encourages the Panel to clarify these and other aspects in consultation with the mine operators.

3.2 Subsidence prediction methodologies are robust and have continually improved over the last decade

The Southern Coalfield Panel was largely supportive of the methods used to predict subsidence effects, including both conventional and non-conventional movements. The methods of subsidence prediction and the assessment of the physical impacts have continued to improve since the release of the Southern Coalfield Panel Report. These improvements have largely developed from the ongoing collection and review of monitoring data and recorded impacts with what is now one of the most extensive subsidence databases in the world.

The monitoring data collected includes three-dimensional monitoring that provides a detailed understanding of the ground movements and the mechanics of mine subsidence. The subsidence models are continually refined and improved as the various components that contribute to mine subsidence are better understood.

The extensive database allows predictions to be carried out using statistical methods, that provide probabilities or confidence levels, rather than single-predicted values. Statistical methods have been developed for strain, far-field horizontal movements and valley closure effects. The application of these statistical methods allows the risks to be better defined and assessed. These methods are continually refined and improved as further ground monitoring data are collected.

Statistical methods for the prediction of strain have been continually improved. This has allowed the range of potential strains to be better quantified based on the site-specific conditions. These methods are also used to quantify the likelihoods and magnitudes of anomalous ground movements which otherwise cannot be directly predicted.

Extensive data have also been collected outside of mining areas, including far-field horizontal movements and valley closure effects. This has allowed statistical methods to be developed for these effects. The application of these methods allows for the careful management of significant or sensitive features. This allows impacts to be better quantified and to determine the appropriate mine setback distances, where required.

Various models have been developed that relate the predicted ground movements to the potential for adverse physical impacts. The models provide a probability of impact so that the risks can be better defined and assessed. This approach is in line with the recommendation of the 2008 Southern Coalfield Panel for increased quantification of the potential for adverse impacts. The impact models have been developed using empirical data and are refined and improved as further data are collected. One such model is used to assess the potential impacts on rockbar controlled streams based on predicted valley closure. At Dendrobium, the rockbar impact model has been used for several streams located outside longwall mining and the performance outcomes were typically achieved. At Metropolitan Coal, the rockbar impact model has been a successful design tool for mining in the vicinity of the Waratah Rivulet.

The best approach to improve the methods of subsidence prediction and impact assessment is the ongoing collection and review of ground monitoring data, review and calibration of the subsidence models, the prediction of ground movements using statistical methods and the assessment of potential impacts that quantify the risk based on data. These methods have been adopted and continually improved since the Southern Coalfield Panel Report.

3.3 Comparisons to the Western Coalfield require further investigation and evidence

The Initial Report makes multiple references to the potential role of surface lineaments associated with zones of major structural disturbance in relation to water loss and potential sources of increased subsidence effects. Lineaments are major surface topographic features or surface manifestations of major structural defects (such as valleys, gorges or cliff lines) caused by underlying regional geological structures.

The Initial Report refers to experience from the Western Coalfield (Springvale Mine), with an unsubstantiated observation that the increased subsidence seen at Springvale associated with lineaments might be repeated in the Southern Coalfield.

Whilst this issue warrants further investigation, it is inappropriate to draw or infer such connections in the absence of any reported evidence.

The lineaments in the Western Coalfields are believed to have their origins in the underlying igneous basement rock which, in the west, lies at quite shallow depths below the sedimentary coal seam strata (tens of metres). However, in the Southern Coalfield it is understood that the basement rocks are some hundreds of metres below the coal seams and therefore the mechanisms and scale of behaviour involved are likely to be quite different between the two regions. There is also believed to be far less evidence of underground impact of lineaments on mining conditions at mines in the Southern Coalfield. Caution is therefore recommended in making direct comparisons between the impact of Western Coalfield lineaments and similar features in the Southern Coalfield. Nevertheless, it is appropriate to investigate this issue further.

The Initial Report also makes multiple references to leakage or enhanced water flow along strata bedding planes, specifically referring to basal shears. Any bedding plane, basal or otherwise, has the potential to either remain intact and resistant to permeability, or allow for horizontal permeability, in either a virgin condition or when subjected to mining-induced shearing. However, there is very little data available at present to validate the nature and extent of such water flow. It is therefore inappropriate to make conclusions about water flows along strata bedding planes, without further evidence.

3.4 Clarify the 200mm target criterion for valley closure

The Initial Report states (p40):

“The PAC for the Metropolitan Coal Project in 2009 was advised during its hearings that a target criterion of 200 mm maximum total predicted closure for avoiding significant impacts was developed based on reviews of previously observed impacts along Waratah Rivulet due to LW 1 to LW 14 at Metropolitan Mine and experience from other mines in the Southern Coalfield. The PAC report stated that because the 200 mm closure limit was an outcome of a prediction methodology that was under development, it was subject to change as the prediction methodology evolves.”

The Director-General’s Environmental Assessment Report for the Metropolitan Coal Project (June 2009) (page 21) stated (emphasis added):

... It has also been accepted by the PAC as the target for HCPL to aim for in limiting impacts on watercourses – the PAC’s proposed standard of “negligible consequences” for key watercourses is “assumed to be achieved” where predicted valley closure is less than 200 mm.

*Nonetheless, the Department notes that MSEC has proposed the 200 mm valley closure threshold based solely on its own qualitative review of watercourse-related subsidence impacts at its client mines. It is generally accepted that the figure is far from established. **It must be seen as indicative rather than determinative. There remains a possibility, particularly for fragile rock types, that significant buckling and shearing of sections of stream beds will eventually be observed where predicted valley closure is less than 200 mm.** Notwithstanding, such impacts are considered to be less likely for rockbars, which by their nature are formed by the more massive and resistant rock strata.*

The impact model relates a study of the historical impacts on rockbar controlled streams with predicted valley closure. A target value of 200 mm closure represents a rate of “Type 3” impact (i.e. fracturing causing a reduction in the pool standing water level) of approximately 10 per cent.

The impact model using a target value of 200 mm predicted closure therefore does not represent avoidance of impact, but rather a low-likelihood of impact.

The impact model is based on the method of valley closure prediction outlined in ACARP Project No. C9067.

The valley closure predictions at Dendrobium and Metropolitan Mines adopt the ACARP method as it is the most widely used and tested. The appropriate target value for valley closure is determined in consideration of local conditions as well as the desired outcome and likelihood of impacts.

The impact model is the best available method to assess the level of potential impacts on streams, particularly those that are located outside mining areas. The model and appropriate target value is continually reviewed and refined as further monitoring are collected.

3.5 Knowledge continues to improve around the contribution of subsidence to changes in swamps

The Panel acknowledges that *“The network of swamp monitoring sites is extensive and much data is collected”* (p114). A comprehensive review of swamp monitoring at Dendrobium⁷ found:

- Long term monitoring of upland swamps has seen changes in swamp size and species composition in swamps both mined beneath and control (not mined beneath) swamps.
- A decline in total species richness has been observed across all swamps following mining; however, the decline was found to be statistically significant in only two swamps, Swamp 1 (Dendrobium Area 2) and Swamp 15B (Dendrobium Area 3A).
- It is clear that the swamps show dynamism in both size (boundary) and Total Species Richness (composition). There appears to be some indication that mining is altering these parameters in upland swamps although it appears that in one swamp (Swamp 1 – Dendrobium) where early changes were detected between 2006-2010, the change in species composition when compared to pre-mining data was not apparent.

Changes observed in swamp size and composition at Dendrobium do appear to have some correlation to subsidence, however natural changes are also occurring in the upland swamps and have been observed in areas beyond the footprint of mining operations. In addition, it is important that any conclusions reached by the Panel clearly separate changes to upland swamps that may result from mining from any broader, naturally induced changes.

NSW Minerals Council

March 2019

⁷ https://www.south32.net/docs/default-source/illawarra-coal/dendrobium/dendrobium-longwall-10-end-of-panel-report/attachment-e1-longwall-12-terrestrial-ecology-monitoring.pdf?sfvrsn=71c43eb8_4