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Save Our Thirlmere Lakes and Creeks

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Submission to the proposed Mine Rehabilitation Reforms

Undermined Inc, is a community action group formed to address concerns about damage caused by long wall mining in the Wollondilly Shire. Undermined Inc campaigns for the remediation, repair and restoration of local creeks, rivers and lakes impacted by mining. Of particular concern is the damage resulting from water loss in Thirlmere Lakes National Park, an area given World Heritage status by UNESCO in 2000.

Whilst the proposed improvements to Mine Rehabilitation regulation appear strongly targeted at open cut mining, we would argue that these principles should also apply to underground mining, in particular longwall mining.

The Tahmoor Coal Mine is an underground mine which operates, among other things, under Environmental Protection License 1389 [1] which is administered by the EPA. This licence sets performance standards for the emission of dust, noise and greenhouse gasses, for the discharge of water and pollutants and biodiversity protection. The standards, and associated rehabilitation requirement, apply only to the pit top and surrounding areas and may not limit or enforce monitoring regimes for the subsidence impacts on the natural environment for the area being undermined.

Subsidence impacts are mainly addressed through the conditions of consent to the Development Application (in the case of the Tahmoor mine, DA 67/98 as amended in November 2012 [2]), which is administered mainly by the Department of Planning and Infrastructure. Subsidence Monitoring Programs (SMP) for each longwall panel are required under the DA and need to be approved by the Director General. This does not always happen.[3]

The SMPs that we have reviewed deal with structures and environmental features, in particular creeks. The likely impact of undermining creeks is set out; however,

[1] http://app.epa.nsw.gov.au/prpoeoapp/ViewPOEOLicence.aspx?DOCID=127874&SYSUID=1&LICID=1389

[2] http://www.tahmoorcoal.com.au/en/publications/approvals/ConsentsLicenses/DA67-98%20(MOD3)%20Tahmoor%20North%20Extension%20Consent.pdf

[3] Independent Environmental Audit Report, July 2015, Page E9 - http://www.tahmoorcoal.com.au/en/publications/IndependentEnvironmentalAudits/20150701-Report-Hansen-Bailey-Tahmoor-Development-Consent-Environmental-Audit.pdf

no rehabilitation is suggested. The compounding impact of multiple underminings of the same waterway is not addressed. When mining has been completed, an end of panel report reviews the damage that has been caused to the creeks, among other things.

The most recent end of panel report for the Tahmoor mine is for Longwall 30. What is reported about the impact on creeks is more or less what has been predicted by the SMP:

- Drying up of pools;
- Reduction in stream volume;
- Elevated levels of certain minerals;
- Connected stream interrupted or disappearing;
- Depressurisation of aquifers

It appears that monitoring continues for one year and then ceases. No rehabilitation is attempted or indeed considered, and the damage to creek beds appears to be seen as an acceptable impact of longwall mining.

In 2005, the NSW Scientific Committee in a determination[4] about the alteration of habitat following subsidence due to longwall mining concluded that, among other things:

- Mining subsidence is frequently associated with cracking of valley floors and creeklines and with subsequent effects on surface and groundwater hydrology;
- Cracking and subsequent water loss can result in permanent changes to riparian community structure and composition;
- The cracking of strata surrounding the goaf may liberate methane, carbon dioxide and other gases, which can result in localised plant death as anaerobic conditions are created within the soil;
- In the Southern Coalfields substantial surface cracking has occurred in watercourses within a number of catchments, with cracking followed by significant dewatering of permanent pools and in some cases complete absence of surface flow;
- Subsidence associated with longwall mining has contributed to adverse effects on upland swamps. The swamps regulate water quality and flows from the upper catchment areas. [5] Mining-induced subsidence may significantly affect the water balance of upland swamps;
- Drying of swamps has impacts on biodiversity, erosion and fire regimes, and may accelerate cliff collapse. The altered hydrological regime may result in a modification to the vegetation community present, with species being favoured that prefer the new conditions. The timeframe of these changes is likely to be long-term and irreversible;

[4] http://www.environment.nsw.gov.au/determinations/LongwallMiningKtp.htm

[5] http://www.iesc.environment.gov.au/system/files/resources/31c097ef-c32d-4f26-bfdb-e5500fdbb0bf/files/iesc-advice-russell-vale-longwall-2014-058.pdf

- Mitigation measures to repair cracking creek beds have had only limited success and were at the time of the determination considered experimental;
- A major issue is the lack of knowledge about horizontal stresses in geological strata, particularly those associated with river valleys. These horizontal stresses appear to play a major role in the magnitude and extent of surface subsidence impacts. The cumulative impacts of multiple panels have been poorly monitored.

Three high profile examples of the environmental damage caused by longwall mining are:

- The drying up of the Thirlmere lakes system after Tahmoor Coal mined through an area of fractured geology near the north-east corner of the national park. Investigations as to the actual geological structure and likely root cause have been very slow and are ongoing.
- The cracking of the Cataract riverbed downstream of the Broughtons Pass Weir to the confluence of the Nepean River. Mining in the vicinity began in 1988 and in 1994, the river downstream of the longwall mining operations dried up. Water that re-emerged downstream was notably deoxygenated and heavily contaminated with iron deposits; no aquatic life was found in these areas. In 1998, a Mining Wardens Court Hearing concluded that 80% of the drying of the Cataract River was due to longwall mining operations. The mining operator has paid compensation to some families, and limited attempts at rehabilitation have not been effective to date.
- The failed remediation program to repair extensive mine subsidence damage to Sugarloaf State Conservation Area in the Lower Hunter. Attempts to grout a large subsidence crack at the top of a ridge in the reserve resulted in more than 180 tonnes of concrete being pumped into a tributary of Cockle Creek at Lake Macquarie.

We suggest that the NSW Scientific Committee re-assesses the impacts of subsidence due to long wall mining on the natural environment.

An improved mine rehabilitation policy will clearly spell out how rehabilitation is being improved, consider scientific opinion and take into account lessons learnt from past adverse outcomes. The present section “Mining and its contribution to NSW” describes mining's significant economic benefits without dealing with mining diseconomies or damage to our environment. An honest policy statement could include:

An optimal rehabilitation policy will have as its objective the restoration of mined surface landforms and subsurface conditions that are safe and sustainably close to how they were before mining and the replacement of ecological communities removed or damaged by mining in their pre-mined locations.

If current policy objectives are to maximise the economic benefits flowing from mining while not approaching optimal rehabilitation of damage to the environment

caused by mining, then it will be honest to state the objectives of an optimal rehabilitation policy are not realisable until some time in the future.

The new policy can learn from past mining that has been less than optimal. Undermined's submission uses actual outcomes of mining carried out with too little regard for the environment at Tahmoor Coal Mine to demonstrate where improvements are needed. At Thirlmere Lakes and in creeks nearby, mining approved in the past has caused mine subsidence and significant changes to surface water. That mining continues to require water to be pumped from below the level of Thirlmere Lakes. An optimal improved rehabilitation policy will establish a mechanism to implement best practice rehabilitation to remedy such problems and will also impose rehabilitation on mining problems that come to light in the future.

The present policy, by offering certainty to miners, implies the community will have to remedy consequences of environmental damage wherever approval conditions prove to be inadequate in future.

Consequently, we make the following submissions in relation to the questions posed in the discussion paper:

Summary

- Mining companies to be responsible for rehabilitation of all impacts of their mining activity, not just those at the mine site;
- Environmental assessment and reporting to be on the cumulative impacts, and not on individual incremental impacts;
- A robust and independently verified risk assessment framework to be established, based on probability, impact and mitigation options of mining damage. No mining where damage cannot be rehabilitated;
- Rehabilitation funding for mine closure to be put in escrow or similar and not accessible for progressive rehabilitation or diluted in other ways during mine operation;
- A monetary value to be assigned not just to economic but also to environmental and social impacts and included in business plan analysis;
- Rehabilitation to target return of the land to pre-mining conditions and use, not to "safe, non-polluting and sustainable";
- A watertight mechanism for mining companies to remain responsible for damage cause or discovered after mining operations cease.

Proposal 1

1. The principles should apply to all land that is disturbed by the mining operation, that is not just the above ground operation (in the case of an underground mine) or the mine pit (in the case of an open cut mine). Disturbed areas should be returned to their pre-mining state and use as much as possible, and just not to "conditions that are safe, non-polluting and environmentally sustainable". An example of a "safe, non-polluting and environmentally sustainable" condition could be to close areas of a national

park that have become unsafe because of cliff destabilisation – which is clearly not desirable.

2. Planned rehabilitation should consider the cumulative impact of mining. As per the previous comment, disturbed areas are considered rehabilitated when they have been returned to their pre-mining state and use as much as possible.
3. The assessment phase should consider the overall impact that the mine will have – in economic, social and environmental terms, and a value assigned to all positive and negative impacts. This means that in the case of underground mining the impacts of the mine site development as well as the impacts of subsidence in the area being undermined need to be comprehensively considered and valued. It would be preferable if this process was handled by a single agency. The assessment must include, apart from structures and improvements, identification of natural features at risk of damage due to mining activities, the degree of risk, the uniqueness, use and value of natural assets (for example the function of swamps, the impact on biodiversity, the result of reduced flows and pollution of streams), and the availability of proven methods to remediate such damage. A risk mitigation framework should be employed and may be used to exclude certain areas from mining with risk of damage and no rehabilitation options.

Proposal 2

1. A simple feasibility test for the removal of the final void is open to wide interpretation. Does this mean technical or economic feasibility, or both? Does the proponent need to demonstrate all four points mentioned or only one of them? Will the mine operator be required to include in its financial planning a suitable amount for rehabilitation at mine closure, and will that money be held in escrow or similar arrangement?
2. The answer to this question very much depends on the circumstances, and who derives the benefit. Where for example pumped hydro is economically and environmentally sustainable this may be an acceptable solution.
3. Once again, the cost / benefit analysis will be different in each situation. The key is for the mining company to set aside appropriate reserves for rehabilitation to an agreed state at the start of the project, and for these reserves not to be diluted during the operation of the mine.

Proposal 3

1. The impact assessment during the planning stage should include all impacts of the mine, not just those of the above ground operations and / or the mine pit. Rehabilitation planning needs to include a risk mitigation framework that is independently assessed and includes identification of both built environment and natural heritage at risk of damage, the likelihood of damage occurring, the resulting economic, social and environmental impacts of that damage, available mitigation options and proven remediation and rehabilitation options to return the land to its prior state and use. This framework should clearly identify where the assessment is based on inferred rather than measured information (i.e. the availability or lack of reliable

geological information) and identify options to improve the reliability of the information on which it is based.
2. Mine planning should include a process that enables a change in mining method to reduce the environmental and social impact of the mine.

Proposal 4

1. Progressive rehabilitation should include the repair and rehabilitation of creek and stream beds, swamps, lakes and other natural features, on the assumption that during the assessment phase acceptable and available remediation options were identified and that mining was limited to exclude those areas that could not be reliably rehabilitated. The mine operator should report cumulative impacts and only be permitted to monitor streams for a limited time before rehabilitation must take place. This to avoid a process where different vegetation more suited to the changed hydrological circumstances can establish itself.
2. The cumulative impact of the whole mine operation must be included in the assessment phase, and preferably be handled by the Office of Environment and Heritage.

Proposal 5

1. Improvements should include limitations on scope creep once the mine lease has been approved. For the mine to extend the area being undermined beyond what has originally approved, it would have to provide evidence that new methods or technologies are available to reliably predict and where necessary remediate damage cause by subsidence. Regulation should also include an option to exclude areas from mining where rehabilitation in similar situations has failed.
2. Environmental reporting by the mine should include all cumulative impacts that the mine has, and not be piecemeal. It should be managed by the Department of the Environment and Heritage.

Proposal 6

1. With specific reference to the drying out of Thirlmere Lakes, closure of the mine whilst an investigation into the actual cause is still ongoing should not result in the mine owner's responsibility to rehabilitate the area to be extinguished, in case the investigation shows that, on the balance of probabilities, mining activity has cause the drying. Participation of the mine in the investigative process should be greatly encouraged. Mine owners should have a clear and enforceable obligation for rehabilitation where significant issues are discovered after the mine's closure. An example would be the pollution and resulting biodiversity impacts in the Wingecarribee river, caused by discharges from the closed Berrima Colliery. [6]
2. There are various views of the global coal market, with coal use under pressure by cheap gas in the United States and renewable energy sources

[6] https://link.springer.com/article/10.1007/s11270-018-3718-0

reaching a price point where they are competitive against coal fired power. It would be prudent to develop a scenario analysis that relies on independent (Bloomberg, CSIRO, Wood Mackenzie, IEEFA) as well as industry information to arrive at a likely forecast for the coal mining industry in NSW, and to establish a regime around mine closures and rehabilitation accordingly.

Yours sincerely,

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