



IT'S THE PITS

NSW's scandalous Government approved coal mining legacy

Lock the Gate Alliance & Hunter and Central Rivers Alliance June 2016



New research from Energy & Resource Insights (ERI) reveals for the first time the number and size of unfilled pits, known as final voids, that the coal mining industry is planning to leave behind in NSW, with the blessing of the NSW government. Open cut coal mines have increased in scale and number over the last fifteen years, but little to no planning has been undertaken for how to rehabilitate the landscape of NSW mining regions to their previous state once the coal is exhausted, or the industry decides the mines are uneconomic. With that day coming faster than expected, the NSW Government's continued acquiescence to industry's demands that it be permitted to leave huge unrehabilitated pits at the end of the mine's life is looking more and more irresponsible.

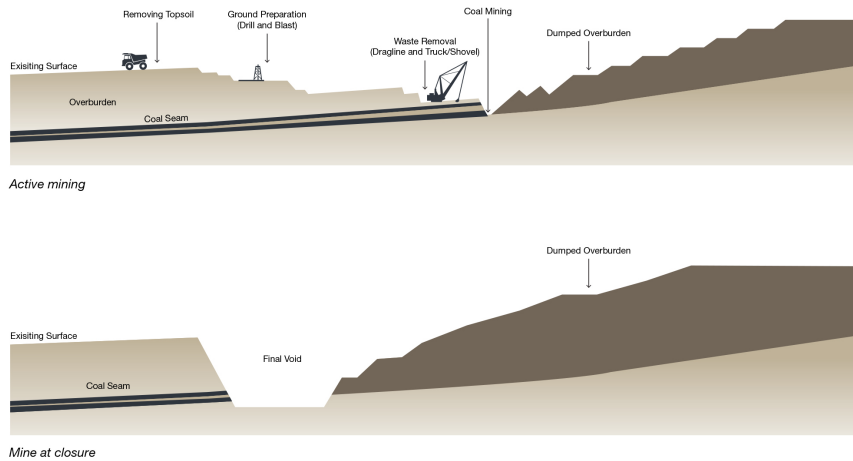
Urgent action is needed to recast expectations and require mining companies to backfill these pits and ensure enough funding is available so all coal mines are fully rehabilitated. The practice of leaving huge unrehabilitated pits was banned for coal mining in the United States in 1977. NSW needs to enforce world's best practice mine rehabilitation as opposed to its current policy of allowing the cheapest and most damaging option which is to leave these pits unrehabilitated.



HOW BIG IS THE PROBLEM?

In the last four years, 2011-2015, 68 coal mines have been active in NSW of which more than half are open cut. Nineteen of the state's open cut mines are located in the greater Hunter Valley, including three in the Mudgee area. Some of these contain pits hundreds of metres deep and kilometres long. There are also six open cut mines in the Gunnedah area, and three in the Lower Hunter and Lake Macquarie. It is difficult to predict what these regions will look like once the coal mines have finished operating.

Simplified representation of open cut coal mining in NSW



In part, this is because the NSW planning system does not require final landforms to be finalised until closure is near. Mines may close early if commodity prices remain below breakeven for a protracted period, resulting in a different final landform than if the mine had operated to its full extent. In addition, mining companies routinely seek approval to expand beyond the original conception of the mine size and shape.

In spite of the obvious cumulative impact of coal mining on NSW coal mining region's land, water and biodiversity, no cumulative impact assessment has been undertaken by the Government. Therefore, there is no way of knowing what the longterm legacy of mining will be on regions like the Hunter and most importantly how to minimise the negative impacts. The Independent Expert Scientific Committee is conducting a bioregional assessment that will provide a better picture of the cumulative impact the mines are having on water, and the Office Environment and Heritage is doing the same for biodiversity, but while this work is being completed, more and more mines and their final pit voids are approved to further damage the landscape.

In the absence of a whole of region approach to managing the impacts of coal mining, the NSW Government has assessed the environmental impact of each mine in isolation. When pressured by industry, the regulators have caved into their demands to allow the cheapest and most damaging option of leaving the pits unrehabilitated. According to the research by Energy & Resource Insights, a total of 45 pits, covering 6,050 hectares are either planned or approved for NSW. By comparison, Sydney Harbour covers an area of approximately 5,500 hectares. These unrehabilitated pits will continue to pose environmental risk for decades, or even centuries, after a mine closes. Most of these unrehabilitated pits will be in the Hunter region, but six are planned and approved for the Namoi region, around the Liverpool Plains.

The biggest of the approved unrehabilitated pits will be at Rio Tinto's Warkworth mine. The pits left by that mine will cover 880 hectares – more than 800 football fields. BHP Billiton's sprawling Mount Arthur mine near Muswellbrook will leave three voids behind, with a combined size of 700 hectares.

RioTinto

WARKWORTH MINE



**> 800
FOOTBALL
FIELDS**



bhpbilliton

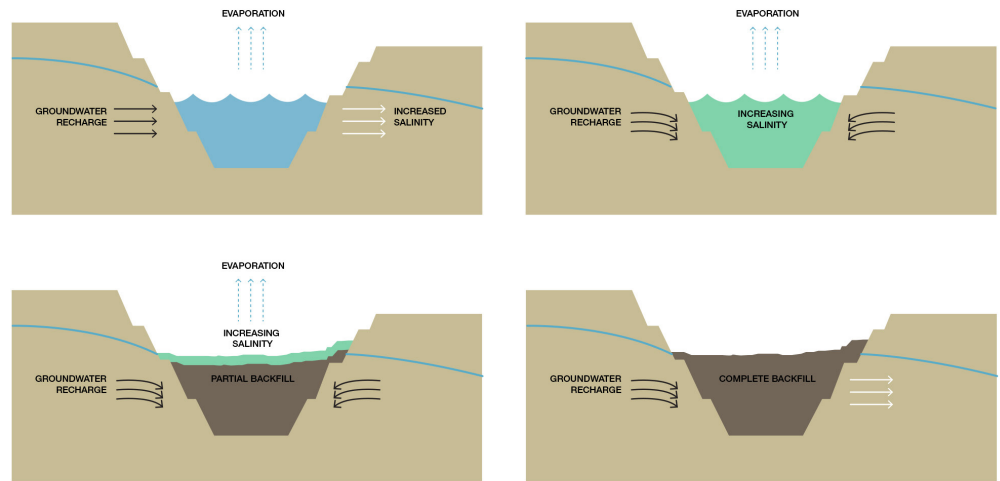
MOUNT ARTHUR MINE



**> 700
FOOTBALL
FIELDS**

WHY ARE UNREHABILITATED PITS A MAJOR RISK TO COMMUNITIES AND THE ENVIRONMENT?

The most serious problem is water. Modern coal mines have pits that may extend 150 metres or more below the natural water table. This means that surrounding groundwater flows into the pits forming pit lakes. Groundwater sources are supplemented by rainfall, runoff and seepage from surrounding mine waste spoil adjacent to the pit. Leaching through spoil can be particularly problematic as spoil can be laced with toxic contaminants and salts.



For many years after the mining is over, the dynamics of water inflow, outflow and evaporation change, until an equilibrium is reached. If evaporative losses from the pit lake balance all inflows, groundwater will permanently flow towards the void and the pit lake becomes what is known as a *terminal sink*. If evaporative losses are *less* than inflows, groundwater outflows may either be balanced by inflows creating a *flow through system* or if the inflow volumes are high, the lake may overflow. The time taken for the holes to fill with water and reach this equilibrium varies. Bengalla's final void in the Hunter is not expected to reach equilibrium for 1,000 years. Other mines typically will take hundreds of years.

Modelling suggests most of the Hunter Valley's voids are expected to become terminal sinks. As a result, local aquifers will be permanently depressurised to some distance from the voids site, depending upon local hydrological conditions. Some mines in the Hunter Valley have been allowed to dig pits perilously close to the Hunter River alluvium, and the alluvial aquifers of its tributaries. The final pit left behind at the Liddell mine, for instance, is expected at its worst to draw 57 million litres of groundwater per day, including water from the Hunter River alluvium.

Voids that become terminal sinks typically become more and more saline over time, as the water evaporates, leaving behind salt. It has been predicted that the large void proposed for Mount Arthur in the Hunter will, after 500 years, contain a million tonnes of salt. The salinity of some void lakes will approach that of seawater. This could pose the serious risk of the pit lakes overflowing in heavy rain.

Modelling suggests that the 300m deep pit lake at the Bulga mine in the Hunter may overflow after 500 years once it is full, polluting Loders Creek.

Predicting how these pit lakes will evolve in regards to whether they are sinks or whether they will overflow is an art, not a science. Predictive models based on a variety of assumptions are useful tools in assessing potential scenarios, but they are not capable of delivering definitive answers about how the lakes will behave and the level of salinity or toxicity. By allowing companies to leave behind huge pit lakes, the NSW Government is effectively undertaking a landscapescale experiment in regards to the cumulative impact of mining on the longterm health of coal mining regions across NSW.



CLEAN UP THE MESS: FILL IN THE PITS

The argument that filling mining pits is not possible or is uneconomic is a nonsense. Since 1977 the US coal industry has been required to backfill its mine pits. The US federal *Surface Mining Control and Reclamation Act* requires the mining company to restore mined land to a condition capable of supporting the uses prior to mining, or to “higher or better” uses. In doing so the company must:

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

The only reason why these outcomes cannot be achieved in Australia is because the regulators have failed in their duty of care in regards to reducing the environmental risk from coal mining to the maximum extent possible and allowed companies to leave unrehabilitated pits as a permanent legacy. In the US governments recognised the need to deal effectively with the impacts from coal mining and established a clear and unambiguous set of policies and goals for coal mine rehabilitation giving certainty to the industry while protecting the community. In NSW there are no clear policies about final voids and pit lakes and the industry has taken advantage of this ambiguity to pursue its lowest cost option.

Beyond the policy and economic issues, science is on the side of filling in the pits. The Independent Expert Scientific Committee has said that “Backfilling is increasingly seen as ‘best practise’ for mine closure rehabilitation and an important aspect to whole of mine planning. This is because long term management of environmental risks and return of land to an acceptable post mining land use can in some circumstances only be achieved by pit backfilling.”

WHAT NEEDS TO BE DONE?

The NSW government has been rumoured to be preparing policy on mine pits for over a year, but so far has continued to issue approvals for more unrehabilitated mine pits, the longterm cost of which will be borne by the community. This continued acquiescence to the mining industry’s lowest cost option needs to stop. A new policy that protects the interests of NSW taxpayers and future generations, not multinational shareholders, needs to be put in place to govern the rehabilitation before the large opencut mines start closing. The first closure, of the Drayton mine in the Hunter Valley, is due to occur at the end of this year but the structural decline of thermal coal as a global energy commodity will likely mean mines beginning to close abruptly, and the public being saddled with the cost and risk of cleanup.

We recommend the following urgent action be adopted by the NSW government:

- (1) A notice issued to operating mines that the 45 planned final pits must be fully backfilled, and a ban on approving any more voids.
- (2) No new mine or expansion approvals to be issued until cumulative assessment is undertaken of the surface and groundwater impacts of the opencut mines.
- (3) The adoption of a policy and legislation based on world’s best practice coal mine rehabilitation, framed by the following four mine site rehabilitation minimum standards:
 - rehabilitate mined land to a condition capable of supporting the uses prior to mining, or to “higher or better” uses;
 - restore the approximate original contour of the land by backfilling, grading, and compacting;
 - minimise disturbances to ground and surface water systems by preventing acid mine drainage and ensuring the effective management of salts, toxic substances and sediments so that no creeks, rivers or other water bodies are impacted from mining based on premining baselines;
 - establish a permanent vegetative cover in the affected area commensurate with its use prior to mining.
- (4) A full review of existing development consents, conditions and bonds to identify residual environmental and financial risk to the NSW taxpayer of unrehabilitated coal mines.
- (5) An integrated costed plan to coordinate the rehabilitation of coal mines across the Hunter Valley, developed in partnership with affected communities, unions, councils, business and Traditional Owners.
- (6) Establishment of an independent Hunter Valley Environmental Rehabilitation Fund, advised by mine closure and rehabilitation experts, funded by the mining industry, to manage a whole of Valley mine rehabilitation plan (see above) to protect the longterm future of the Hunter Valley and its communities.