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Monday May 26th, 2014

Mining and Industry Projects
NSW Department of Planning & Infrastructure
GPO Box 39
Sydney NSW 2001

Dear Sir/Madam,

State Significant Project – Angus Place Mine Extension (SSD 12_5602)

Position of the Colong Foundation

The Colong Foundation for Wilderness strongly objects to the proposed extension of underground longwall mining at the Angus Place Colliery because it will cause significant environmental impacts to the Coxs River, nationally endangered swamps and associated streams on the Newnes Plateau in the Gardens of Stone Stage Two reserve proposal. Through the pollution and reduced reliability of flows of affected streams on the Plateau this mine extension proposal will also impact on the Greater Blue Mountains World Heritage Area.

The proposed mine extension must be subjected to major review to reduce the intensity and extent of the proposed mining operation so that the likely significant environmental impacts can be moderated. The outstanding national and international heritage values of the Gardens of Stone region must not be impaired.

The Colong Foundation requests that this proposal and the adjoining Springvale mine extension (SSD 12_5594) be subject to a concurrent Planning Assessment Commission review process with public hearings. Two sets of hearings on these mining proposals should also be held concurrently and permit questioning of parties to these hearings and responses by them. Such a process is necessary because significant policy for longwall mining rests with the determination findings and recommendations for these proposals.

As the Department would be aware, the proponent, Centennial Coal has made a number of assertions that need to be tested, the most remarkable of which is that there is almost no evidence that longwall mining has caused damage to swamps on sandstone. Another claim of an equivalent remarkable nature is that mine discharges will not impact upon the Coxs River. Such claims seem to rest on very little supporting evidence, and be contradicted by the facts as the Colong Foundation understands them.

In addition, this proposal should not be granted a long-term approval. If the Commission were to determine that the proposal should be approved following a major review, then the Colong Foundation recommends that a staged approval process be adopted. In addition there should be triggers requiring an immediate review of consent conditions, should impacts be observed in the environmental matters of national or international significance. There has been too much controversy and too many unexpected adverse impacts associated with the operations of both these underground mines to permit consent for a period of 25 years as requested by the applicant.

The consent can easily be staged, in a manner that builds on the development control experience from the Dendrobium Colliery in the Southern Coalfield, with planning approval issued for no more than five years at a time. Further, consent should be subject to performance standards' triggers that ensure the health and integrity of national and international heritage values. If trigger levels are exceeded then consent should be reviewed to address the failures. Such a supplementary approach is, however, only as good as the monitoring of key indicators, and this is where the current regime fails abysmally for these mines.

The Colong Foundation believes that self-regulation and adaptive management does not work, as the regulator having a vested interest in finding no impacts, consequently finds none. A large component of this submission will illustrate that self-regulation at Angus Place Mine has been unsuccessful.

One solution to this regulatory problem is to permit others to provide effective input to regulation, or at least to inform it, so as to avoid regulatory failure that tends to occur when over-taxed state agencies alone are responsible. The current arrangement of third party interest groups providing input directly to the company has failed.

This submission outlines in evidence and observations many years of damage to Newnes Plateau upland swamps and streams on sandstone by both Angus Place and Springvale mines.

The facts will demonstrate that this proposed mine extension is likely to result in unacceptable consequences to swamps and streams. The apparent omission from this Environmental Impact Statement of past evidence by Centennial's consultants (and third parties) is cause for serious concern. This evidence describes damage to swamps and streams caused by its longwall mining on Newnes Plateau of an intensity equivalent to that now being proposed. Such action appears to indicate unprofessional conduct by the company's consultants.

The clear evidence of swamp damage over many years combined with Centennial's denial of this damage and poor efforts to repair it necessitates strong protection zone measures and a significant reduction in mining intensity for this proposal. Newnes Plateau is a high conservation value area which merits protection in a state conservation area. Newnes Plateau is at great risk of serious environmental damage by continued inappropriate, poorly managed and controlled mining operations if this proposal proceeds as proposed.

General: Mining-related rock fracturing impacts on stream flow

The following generic description of the groundwater impacts associated with longwall coal mining is the Colong Foundation's understanding of the mining-related damage to streams and swamps in the Gardens of Stone.

Firstly "Groundwater levels drop as confined aquifers become rapidly unconfined.

Second, topographically high or perched aquifers drain to lower aquifers and zones through aquitards fractured by subsidence.

Third, increased fracture permeability over the panel decreases hydraulic gradients, lowering heads up-gradient.

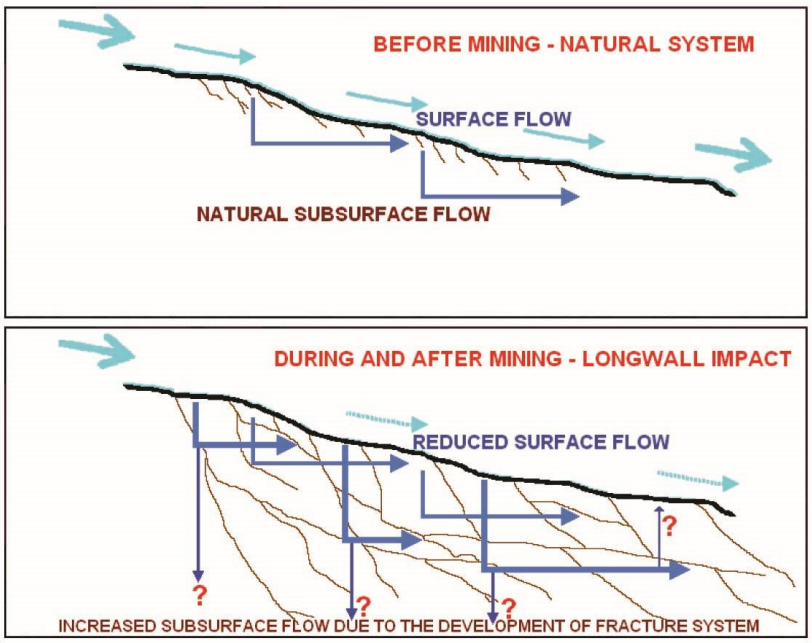
Fourth, drawdown spreads out around and ahead of the primary head drop in the subsided area, to an extent varying with transmissivity" (Booth, C., 2009). If overlying rock aquifers above a mined coal seam become hydraulically connected with surface waters, then the stream may lose its permanent base flows, particularly if associated near-surface aquifers are compromised by rock fracturing.

"A reduction in streamflow may not only be the result of fracturing streambeds and rockbars in the main stream overlying an active longwall mine; mining-induced fracturing can extend across the catchment and its tributaries, generally bounded by the limit of subsidence. Whereas the primary head drop from increased fracture porosity occurs in the subsidence trough defined by the angle of draw, the extent of the transmitted drawdown itself defines the vaguer angle of dewatering influence" (Booth, C., 2009).

"Increased fracturing allows rainfall to infiltrate and recharge fractured aquifers, reducing runoff available for recharging streams. Although rainfall recharge to the shallow aquifers can increase, groundwater levels can also decline due to the mining-induced fracturing of the rock mass, causing the dewatering of shallow aquifers and reducing base flow discharge" (Jankowskia, J, 2009).

Expressed another way, the cracking across large areas of headwater catchments would increase the downwards permeability in the near-surface aquifers. This cracking of a catchment may greatly reduce the capacity of near-surface groundwater to support stream flow, such as in the case of Junction Swamp and across the headwaters of Kangaroo Creek on Newnes Plateau.

Centennial Coal claims that much of the water disappearing from fractured streambeds may re-emerge further downstream. There is evidence to the contrary for East Wolgan Swamp. Such re-emergent surface water is often heavily contaminated with groundwater polluted with salt and metals. This re-emergent, potentially eco-toxic water could not help a swamp or affected stream reach upstream that had suffered water loss. Any downstream sensitive instream environments and riparian environments, such as some shrub swamps and the Greater Blue Mountains World Heritage Area, could be impacted by eco-toxic groundwater effluent.



Model of longwall mining damage to near surface groundwater aquifers (Jankowskia, 2009)

Past loss of stream flow in Kangaroo Creek and the Wolgan River by Angus Place Colliery

The flow of Kangaroo Creek has been much reduced since May 1996 when longwall operations commenced under a swamp in its headwaters. Very low flows from the headwaters of Kangaroo Creek have continued ever since. A small dam located on Kangaroo Creek downstream of the mined area has never been full since 1997. The bed of the dam is now vegetated. Aerial photography from the 1980s shows the dam full. Since mining by Springvale Colliery, upper Kangaroo Creek only flows very rarely after heavy rain and usually has no flow at all (Centennial Angus Place, June 2009). These flow patterns appear abnormal. An unmined headwater swamp should store water from heavy rainfall events and afterwards provide at least some persistence of downstream flows. Since mining, no persistent stream flow has been observed. An area of leptospermum dieback has been noted (Centennial Angus Place, Dec. 2009), suggestive of a permanent ecological change in downstream riparian conditions.

Downstream of the abovementioned small dam, western ends of longwalls 930 to 980 of Angus Place Colliery pass under Kangaroo Creek with a depth of cover of 260 metres above the coal seam. On 16 April 2007, stream flow monitoring on Kangaroo Creek downstream of the SMP showed a loss of flow (Centennial Angus Place, 28 August 2008). The groundwater monitoring site on Kangaroo Creek Swamp then indicated a sharp fall in groundwater levels on 17 June 2008 with the passage of longwall 940 under the swamp. The fall was attributed to subsidence cracking and the creek stopped flowing at that point (Centennial Angus Place, August 2008). Creek flows above longwall 940 were reported to occur “through fractures in the underlying rock” (Centennial Angus Place,

August 2008). Subsequent monitoring has revealed continued low water flows in the creek (Centennial Angus Place, Dec. 2009).

Dieback of the swamp on Kangaroo Creek above longwall 940 indicates a permanent change in groundwater conditions. Photo: C. Jonkers, 2009

The shrub swamp on Kangaroo Creek is showing no recovery four years after mining. The waterhole upstream of this swamp is dry. Photo: C. Jonkers, May 2014

The natural Wolgan River flows are also believed to be reduced, and are associated with a bright orange sediment in the reach that passes through the Emirates Wolgan Valley Resort. Relative to the river's pristine eastern tributary, Carne Creek, the main Wolgan River is in a poor condition within the resort property (Joost Heymeijer, 2009, pers. comm. and Lithgow Mercury 23 Jan, 2010).

Pristine Carne Creek (left) flows into the Wolgan River (right) at the Emirates Wolgan Valley Eco-resort. The red stain is a metal precipitate of iron and manganese, and this same mine effluent was used directly in the Wallerawang Power Station in 2007 (Photo: Jack Wolfenden, Dec. 2008)

The connection of longwall mining with reduced stream flows associated with bright orange sediments is a common occurrence. It has happened at Waratah Rivulet and elsewhere in the Southern Coalfields, such as at Native Dog Creek.

Waratah Rivulet, what's left of it – 2006 upstream of Woronora Dam. Photo: J. Sheppard

Impacts caused by tilted surface rocks due to mine subsidence

Stream beds and swamps are further damaged when the rock strata supporting them are tilted by mine subsidence. Mine subsidence is never uniform, but tilts the original terrain. The streams then flow heavily against a downward tilted bank, causing erosion. An upward tilted stream bank will dry out, perhaps resulting in ecological change, such as the drying of shrub swamps comprising sedges, reeds, ferns and mosses. When upland swamps are tilted, they are highly prone to erosion and desiccation. Under subsequent heavy rainfall, swamps subjected to tilt and/or a loss of soil moisture can develop a 'nick point' from which the entire earth profile of the swamp may be washed downstream (A. Young, 1982).

The loss of Flat Rock Swamp in the Woronora Special Area and Drillhole Swamp in the Metropolitan Special Area should be attributed to these processes. Swamps cope well with natural processes, like severe bushfire, heavy rain and upslope erosion and sedimentation, they operate as the 'kidneys' in the catchment. To assert, as the Department of Primary Industries has (2008, quoted in App. D, page 79, Vol. 2 of the EIS) that swamps can be severely damaged by natural processes is poor reasoning. Swamps are very old and stable parts of the ecosystem and are used to research fire history back to the Holocene (14,000bp) (Mooney, SD and Black, M, 2004).

Drillhole Swamp did not collapse due to exploration drilling or bushfire, it collapsed due to tilting of the underlying rock strata. Photo: A. Young

Potential cracking of uppermost sandstone rock strata under streams and swamps in the proposed Angus Place mine extension area

Centennial Coal and Colong Foundation agree that the uppermost sandstone bed supporting all streams and swamps in the areas undermined will be cracked. This includes the headwater subcatchments of the Wolgan River and, for the first time, Carne Creek which contains the best examples of upland swamps on Newnes Plateau. The cracking that 'generally' is less than 10 to 15

metres (page 65 of Appendix D, Vol. 2 of the EIS) will, in fact, be wide-spread across the area mined. The cracking interacts with the natural vertical joints that extend to depth, enhancing vertical permeability and general connectivity of shallow near-surface groundwater following longwall mining. The general surface and near-surface sandstone rock fracturing is further enhanced by the 'major geological structure zones' alias faulting. Taken together all these new fractures, and remobilised joints and faults, create new hydrological processes in the catchment, which Centennial Coal asserts have no significant impact on streams or swamps. Additional to these cracks, and remobilised joints and faults, are upsidence movements within valleys that cause 'dilation' of the surface sandstone strata, that is, cavities. All these processes operative in a catchment can have dramatic adverse effects.

Surface cracking is predicted to be less than 5 to 25mm [wide], with isolated cracking is some locations greater than 50mm [wide] (App. D, page 50). This needs to be read in the context of the heavily jointed and faulted area proposed to be mined. In this context cracking in the order of 50mm will be more likely in areas with geotechnical hazards (e.g. see Fig. 8.6 page 231 Vol. 1). It appears from the examination of this figure that cracking along Wolgan River will be exacerbated by a lineament zone. Lineament zones will also increase cracking if longwalls 1010 to 1017 are mined as proposed. Cliffs are associated with these lineaments and these areas are more unstable so a more precautionary approach is needed in relation to setbacks.

The consultants for Centennial Coal make assertions that there is no net loss of water from stream catchments (called drainage lines in App. D, Vol. 2 of the EIS) and that 'Any diverted surface water is likely to re-emerge into the catchment further downstream' (page 66, App. D). The consultants for Centennial conclude 'It is unlikely, however, that this would result in adverse impacts on the overall quality and quantity of water flowing from the catchment.' This statement is misleading. It is more likely that what has happened previously to the Wolgan River and to Kangaroo Creek will be repeated in the streams above the proposed longwall mining area. In these areas, water was lost downstream as well as within the mining area. Even if this was not the case, the water diverted into the near-surface groundwater does not assist the natural functioning of swamps undermined, even if the water does emerge downstream.

Similar discharges of orange sediment to those described above for Waratah Rivulet and the Wolgan River but now proposed for an area of Newnes Plateau upstream of the Greater Blue Mountains World Heritage Area are of great concern. Any water flowing through cracks and dilated sandstone strata must not pollute the World Heritage Area and the relevant regional discharge standard must use a pristine creek (e.g. Carne Creek) as a baseline, not some standard provided by a degraded creek nearby. The Colong Foundation requests that the high conservation/ecological value ANZECC/ARMCANZ (2000b) system is the appropriate guide for deriving default triggers for the World Heritage Area and its upstream buffer area, particularly for Carne Creek which has a salinity lower than rainwater.

Centennial's mine subsidence consultant suggests that the cracks will naturally fill with soil, the implication being that this will restore natural flows and the hydrological system of the mined area. The claim on page 65 of App. D, Vol. 2 of the EIS that a letter by Centennial (2008) to the then Department of Primary Industries stating "Following rainfall during the last week, surface flow has

resumed over the Longwall 940 surface area of Kangaroo Creek and the water level in the bore has returned to within 50mm of the previous level", indicates that these impacts appear to be transient. Elsewhere, there has been *no reported loss of surface water flows or adverse impacts on the drainage lines for the previous mining at these collieries"* (my emphasis). Just about everyone involved with these mines is aware that this latter statement is incorrect.

Past damage to swamp by Angus Place Colliery

Longwall mining at Angus Place Colliery has impacted on swamps, including the swamp on Kangaroo Creek above longwall 940. The loss in 2008 of groundwater due to surface cracking has doomed this groundwater dependent swamp. No further detailed monitoring, let alone restoration action, has been undertaken for this swamp. Other swamps on Lambs Creek downstream of a previous area are believed to have been destroyed in earlier Angus Place mining operations.

Eucalypts growing in what appears to be a former swamp on the lower reaches of Lambs Creek (Photo: C. Jonkers, 2009)

On the 3 July, 2007 extraction of longwall 940 was reported to have caused cracking associated with Narrow Swamp, which is situated on the headwaters of the Wolgan River downstream of Springvale's discharge point 5 (Centennial Angus Place, 28 August, 2008, section 4). Greater than expected subsidence of 1.456 metres was associated with surface cracking and is associated with [connected to?] a fault/fracture zone known as the "Wolgan Lineament" at the northern end of the swamp (Centennial Angus Place, Feb., 2008, pg 2). Coral fern, one of the indicator species for swamp health, has shown a decline in condition (Centennial Angus Place, April 2008, pg 41).

East Wolgan Swamp is so important it was nationally listed as an Endangered Ecological Community and also state listed under the NSW Threatened Species Conservation Act in 2005, but undermining has ruined it.

Two metre collapse in East Wolgan Swamp due to loss of near surface groundwater, May 2010

East Wolgan Swamp is above coal pillars and subsidence would be expected to be much less than above the longwall panels (see figure right on previous page). Yet the surface damage is extreme and the habit for Blue Mountains Water Skink (*Eulamprus leuraensis*) that was present in this swamp has almost certainly disappeared from the swamp.

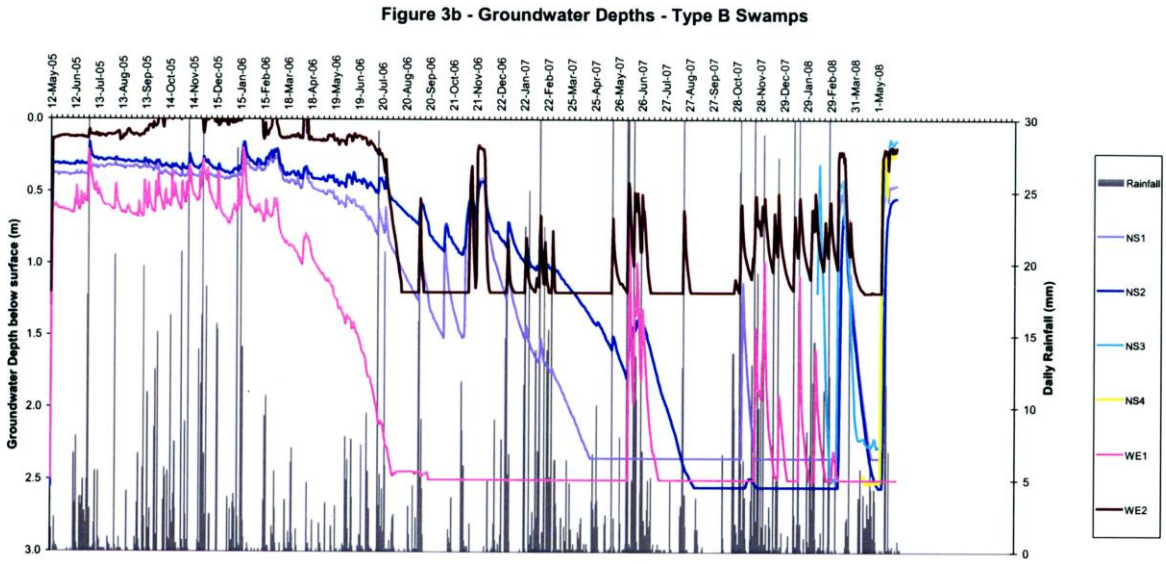
After mining and the subsequent cessation of artificial mine effluent discharges through the swamp, the groundwater disappeared from the swamp's soil profile and had not returned by May 2010 when the peat had dried out, collapsed and cracked.

East Wolgan Swamp is now extremely susceptible to fire damage and exotic species invasion. The groundwater has drained through the cracked rock below the peat. It is not possible to rehabilitate this site using the remediation strategies proposed in Centennial's Swamp Plan (e.g. bunding with matting). These techniques will not deal with the primary cause of damage - the cracking of the underlying aquitards!

Centennial's Subsidence Management Status Report for March 2007 incorrectly stated that the crack is 'minor and the evidence being gathered in the form of sequential photographs is demonstrating that the cracks are rapidly weathering and filling with silt'. The subsequent assertion that stream flow will resume is not supported by any evidence.

Centennial's alleged minor [upsidence] cracking claimed to have no effect on East Wolgan Swamp (Photos: C. Jonkers, 2008)

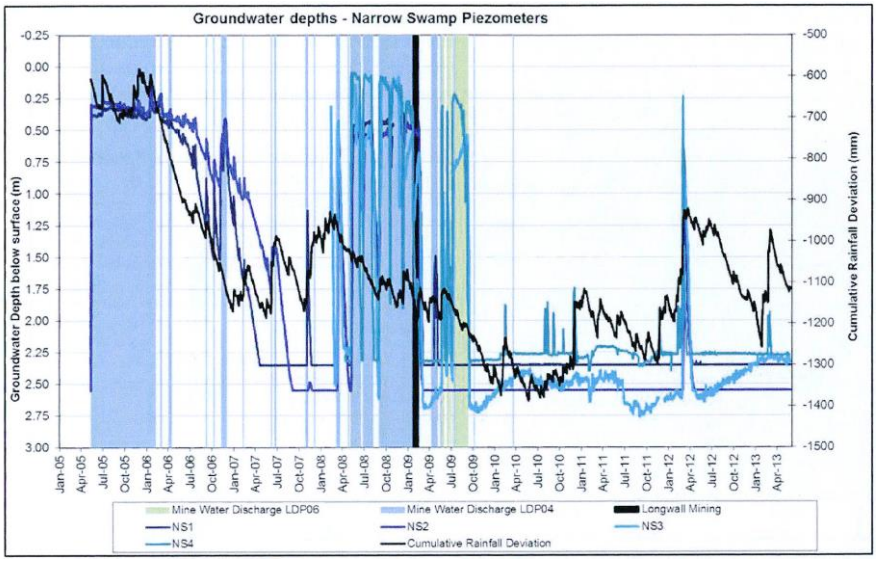
West Wolgan Swamp which is entirely above the Angus Place Colliery, has also shown an increase in abundance of Eucalypt species (Centennial Angus Place, June 2009, page 42) indicating that this swamp has dried out.



Piezometer traces for Narrow Swamp and East Wolgan Swamp May 2005 – May 2008

The above piezometer traces are for very shallow bore holes, all holes being less than three metres in depth. The bores for Narrow Swamp were under Angus Place longwall 950 and East Wolgan Swamp (WE 1 & 2) were located at the eastern end of longwall 960 over the coal pillars and also near Springvale longwall 411 located to the east.

The traces in the above figure indicate the classic piezometer response to longwall mining with groundwater levels falling to the bottom of the hole and staying there, except during heaving rain events. Centennial Coal claims its mining will not impact on swamps but has little evidence to support its claim.



The hydrographs of the four piezometers in Narrow Swamp in Figure 8.5 for the Angus Place extension proposal (Vol. 1, page 228 – reproduced above) reveal that the above 'bottom of the hole' groundwater level trends continue for these bores at least till April 2013. Claims in section 8.2.3 and the text for Figure 8.4 that claim Narrow Swamp was only a periodically waterlogged swamp (see pages 226-227, Vol. 1 of the EIS) are incorrect. The East Wolgan piezometers (WE1 and WE2) are above coal pillars and were affected in June 2006 by Springvale colliery longwall 411 to the east. The two piezos in the Wolgan East Swamp (WE1 and WE2) had continued to show limited response to any rainfall events, along with rapid declines afterwards (Springvale Colliery, Nov. 2007, pg 14).

Once the piezometers have been affected by nearby longwall mining, the hydrograph trace takes on a spiky appearance due to either the mine effluent from LDP005 or heavy rainfall. The hydrographs after the 2008-2009 emergency discharges do not express the slow drawdown character previously recorded because the sandstone rocks under the swamps have been fractured.

Loss of flows through Narrow Swamp

Narrow Swamp (south and north) sits entirely above the Angus Place colliery. A significant reduction in flow was observed between the 8 ML/day at Springvale's discharge point LDP5, above Narrow Swamp, and 4 ML/day at the weir downstream of Narrow Swamp (Centennial Angus Place, Aug., 2008, pg 26). This discrepancy amounted to 244 megalitres over the discharge period from May to July 2008 (Centennial Angus Place, Aug., 2008, pg 11). A second monitoring effort found a discrepancy of 217 megalitres situated upstream, apparently associated with the yet to be mined northern half of the swamp (Centennial Angus Place, Dec., 2008, pg 11). Once emergency discharges ceased, the near-surface groundwater fell rapidly below the base of monitoring bores (Centennial Angus Place, Dec., 2009, pg 10).

It is probable that the mine related cracking and fracturing, possibly exacerbated by the Wolgan Lineament, has increased downwards porosity of the rock strata under the southern end of swamp. The large stream flow discrepancies and rapid falls in groundwater levels within Narrow Swamp may be explained by the rapid downward drainage in the damaged aquifers. A possible drawdown of an unconfined surface aquifer within the northern part of the swamp may be somehow associated with the losses.

Poor Swamp monitoring

The monitoring data collected for mining companies regarding swamps, surface water and groundwater has failed to report on obvious swamp and stream damage.

The monitoring has not provided the necessary information to assist decision-makers regarding the damage to these swamps and streams. This could be as simple as the provision of clear images to regulators of the worst examples of dead swamp vegetation and streambed cracking. Groundwater monitoring bores, for example, meet regulatory requirements but do not appear to identify problems that can be observed in dying swamp vegetation.

Some swamps in the Gardens of Stone are used as controls for current mining activity. These swamps are not separate from mining activity and are scheduled to be undermined. Mining would

nullify their value as a control. Swamp vegetation condition monitoring programs often do not refer back to the original vegetation condition at the time of the preparation of the environmental impact statement.

Centennial Coal has also admitted that its monitoring has contributed to damaging these nationally endangered swamps. 'Centennial's monitoring effort on the Newnes Plateau is extensive (refer to Figure 3.9 in Vol. 1 of the EIS) and contributes to an increase in anthropogenic impacts, such as recreational 4WDs, through the establishment of access tracks for monitoring' (Page 39, App. I, Vol. 2 of the EIS). Centennial Coal has not rehabilitated tracks cut to monitoring sites. Once the monitoring effort is completed, inappropriate recreational use continues causing ongoing environmental degradation.

Further, Centennial Coal's consultants use trail bikes to access monitoring sites, and appear to drive through nationally threatened swamps as indicated by the following image. Note also the dead coral fern in the image below, indicating that the swamp has been drained.

Track cut through a now dead hanging swamp by trail bike leading to a monitoring site (May 2014)

Centennial proposes to curtail swamp monitoring, apparently because it has 'proven' in this EIS report that longwall mining causes no significant damage to nationally endangered swamps, despite the activity being a key threatening process endangering swamps. Centennial further proposes to fund rehabilitation of the trails it cut for monitoring purposes using the funds saved from curtailing its monitoring effort.

Failure to properly rehabilitate all monitoring trails is a breach of mining lease and development content conditions. Centennial Coal cannot cross trade its monitoring and rehabilitation obligations.

Regulatory and determining authorities should not agree to Centennial Coal's proposal to reduce swamp and stream monitoring as these authorities would then be responsible for the likely failures in identification of further damage to these important resources. Regulatory authorities should fine Centennial Coal for its admitted failure to rehabilitate its monitoring tracks in a timely fashion, especially due to this cynical attempt to offer to do its rehabilitation duty if it is relieved of some of its monitoring obligations.

Centennial Coal through this proposal has demonstrated it is no longer interested in properly discharging it monitoring obligations. The Colong Foundation believes that monitoring duties should be supervised by a third party, perhaps the Office of Environment and Heritage, but fully funded by Centennial Coal.

Swamp Plan is fundamentally flawed

G.E. Holt and Associates carried out an assessment on the Subsidence Predictions and Subsidence Impact Assessment for Angus Place Longwall Panels 930 to 980. This report stated that: "There has been minimal surface cracking associated with the subsidence from the mining of the 920 Longwall panel. The same results are expected for subsequent panels 930-980. Consequently, *the likelihood of significant negative impacts from mining on the Newnes Plateau Shrub Swamps is very low*" (my emphasis).

"The geological sequence that overlies the Angus Place mine workings is one that accommodates mining related movements better than most. The predominantly sandstone sequence is not extremely brittle compared with the sandstones of the Southern Coalfield and appears to allow reduction in subsidence more than what would be expected from a cursory study of the mining parameters. Coupled with this is the fact that mining is moving underneath a relatively flat plateau, intersected by few streams and those streams form the uppermost tributaries where *subsidence impact on the stream beds is benign compared with the incised valleys of the Southern Coalfield*" (my emphasis).

Clearly the damage to East Wolgan Swamp is not a 'benign impact' and it is not an isolated event, as other swamps nearby have been seriously damaged. Why didn't the regulatory agencies question the above assertions given the hundred or so cliff falls and even more plentiful surface cracks around the Plateau caused by Angus Place Colliery?

The Southern Coalfield Inquiry and the Metropolitan Inquiry both recognised valley-infill swamps as especially vulnerable to subsidence impacts, and these conclusions are equally relevant to Newnes Plateau. Contrary to the assertions by Mr Holt in the Swamp Plan, the Newnes Plateau would appear to have topography similar to the Southern Coalfield. The stream pattern depicted in maps of the Swamp Plan doesn't sit comfortably with the plan's assertion that the area is 'a relatively flat plateau intersected by few streams'.

The Swamp Plan is based on incorrect geological and geomorphological assumptions and a flawed monitoring strategy that could not detect damage in a timely fashion. The Swamp Plan's perverse conclusion that longwall mining of Newnes Plateau would be benign demonstrates that the coal

industry can't be trusted to protect significant environmental values, such as the nationally endangered swamps found in the Gardens of Stone. Effective mine subsidence protection zones are needed for these "protected" swamps.

Even when rehabilitation action has been triggered by the 'Swamp Plan' it has been ineffectual and half-hearted. The rolls of coir logs have been found left abandoned, the dumping of branches from the surrounding forest will encourage dry-land vegetation, not the regeneration of swamp vegetation.

One of two piles of abandoned coir matting on East Wolgan Swamp (J. Favell, 2014)

Bunding using coir matting and other erosion controls will not restore these swamps. Only restoration of the fractured underlying sandstone strata has any chance of restoring damaged swamps. Grouting with either cement or other compounds have not proven successful to date and to attempt such methods would be highly damaging to the swamp. The only way to protect swamps is to prevent surface cracking of the sandstone that underlies them with through protection zones or reducing the intensity of underground coal mining.

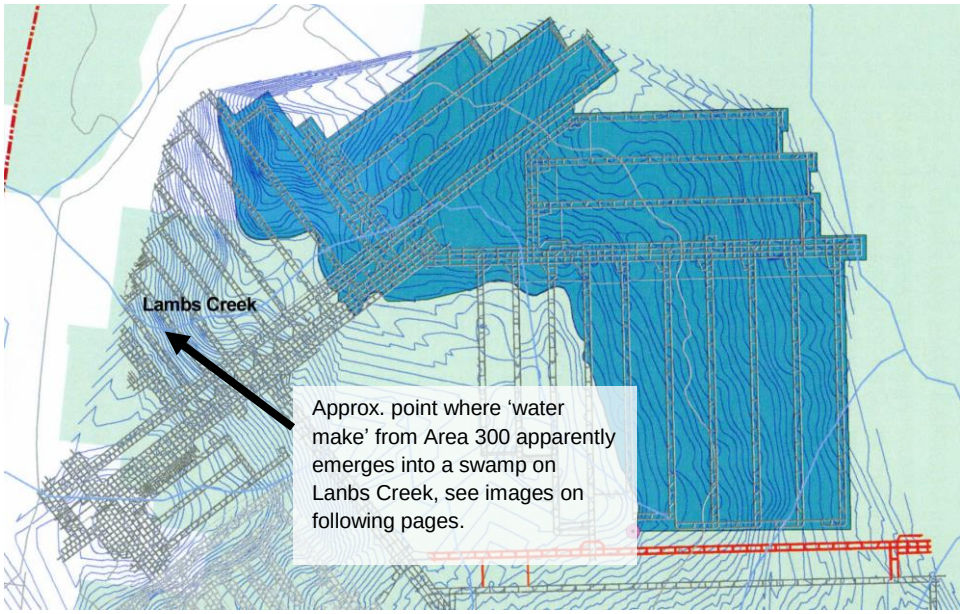
Past unauthorised discharges of water make

Centennial alleged that Area 300 can store water 'at an average rate of approximately 4.7 megalitres of water per day' (Env. Assmt. For 06_0021 modification Dec 2010, page 4-23, Appendix 7.3). This underground water storage appears to be the source of water emerging nearby at Lambs Creek which was subjected to longwall mining several decades ago.

The Colong Foundation has observed a large amount of water welling up from the ground into a wetland on Lambs Creek near where the creek emerges onto private land. Upstream of this swamp, the creek is dry due to longwall mining operations at a shallow depth of cover.

This water re-emergence appears to be an unlicensed discharge from the underground water storage, Area 300, Angus Place Colliery. This discharge was not considered in the Water Balance provided in the Environmental Assessment for modification of the Project Approval.

The emergence of water make into Lambs Creek should be investigated to confirm that it has water make characteristics. If it has, then the applicant should be asked to explain why it has not notified authorities of this source of mine effluent for the last three decades.



Mine water make dependent swamp on Lambs Creek, and the pagoda from which the image below was taken

Looking down from a pagoda at the characteristic rust coloured water make in Lambs Creek and the unnatural green swamp

Emergency storage arrangements for the proposed 2014 mine extension

Any malfunction of the SDWTS, such as the destruction of the pipeline during a bushfire, must not result in emergency discharges to the World Heritage Area via Wolgan River or Carne Creek. The existing EPL3607 must require LDP004 and LDP005 to be decommissioned as emergency discharge points.

The proposal to redirect emergency mine inflows from the SDWTS underground into the Angus Place Colliery's 900 water storage area via the existing Angus Place 940 Bore facility is conditionally supported, provided that these transfers do not then re-emerge to the surface and escape the mine site as untreated effluent. The Colong Foundation is, however, suspicious of the above arrangement given the previous unauthorised mine effluent discharges.

The Colong Foundation notes that no daily capacity estimates have been provided for this proposed re-insertion arrangement. Given that the capacities are up to 43.8Ml/day, requiring 710mm diameter pipes laid underground, these unspecified arrangements seem highly dubious and require further consideration by the regulatory authorities. The Colong Foundation suspects that the 900 area would be flooded unless constantly kept dry by a major pumping effort. The Colong Foundation notes that the 900 area is contiguous with the 300 area and that the unauthorised discharges as described above are still operative on Lambs Creek.

The Colong Foundation notes the response made by Centennial Coal in April 2011 (PA 06_0021 modification) regarding the unauthorised re-emergence of mine effluent into Lambs Creek. While there is obviously a height difference between the Lithgow coal seam and the ground surface, re-emergence of this water has occurred.

Value of the area above the proposed Angus Place extension area

Newnes State Forest has only been subjected to selective logging in certain places, and is mostly unlogged old growth forest, contrary to the claims on page 97, s 2.8.1 in Vol. 1 of the EIS. The claim that 'as a consequence of forest harvesting and fires, large areas of forest are relatively young with a low to moderate density of hollow-bearing trees' is an overstatement. These eucalypt forests and woodlands are adapted to wild fire and mostly old-growth with a high density of hollows. Further, the sheltered gully forests offer protection for wildlife and even the hottest fires do not entirely burn Newnes Plateau due to its dissected, rocky terrain. The overall importance of this forest should not be discounted as claimed by Centennial Coal.

In addition to the nationally endangered swamps, the main vegetation of Newnes Plateau is Sydney montane sclerophyll forest (Keith, 2004), (*Eucalyptus dives E. pauciflora E. oreades*) with a shrub understorey and groundcover of prostrate shrubs and sclerophyll sedges. There are also extensive areas of heath and mallee areas, (the largest areas of heath in the western Blue Mountains according to Wilkinson et al 2006).

Newnes Plateau includes a high number of rare plant species (a provisional list is below). The reasons for this may be that the area functioned as a refuge during past drier periods. The high number of prostrate plant could possibly have their origins in glacial times (20,000 years bp) when there was a more open shrubland, subsequently invaded by eucalypts, particularly in the southern end towards Clarence where rainfall is probably higher, and plateau soils deeper.

List of significant Newnes Plateau plant species (not complete): Sydney Montane sclerophyll forest - *Persoonia hindii; Isopogon prostratus; Banksia penicillata; Micromyrtus sessilis* prostrate form; Newnes Plateau sedgeswamps - *Boronia deanei; Dillwynia stipulifera; Olearia quercifolia; Celmisia longifolia; Notochloe microdon;* Heath and mallee - *Eucalyptus gregsoniana* heathy balds; *Eucalyptus laophila* pagodas; *Dianella sp nov.*

According to Doug Benson (2006) 'The importance of maintaining intact natural landscapes with substantial gradients of temperature and rainfall will be particularly significant in the context of future climate change, which is likely to result in higher temperatures and lower rainfall. The Newnes Plateau, with its higher elevations, regionally lower temperatures and higher rainfall, but with generally similar soil and nutrient conditions to the surrounding landscapes, is positioned at the mesic end of the temperature/moisture gradient. Its vegetation community and habitats are likely to be part of a future natural refuge area, allowing local populations of species which are depleted, or die out in the drier conditions elsewhere to persist there.' Centennial claims that Newnes Plateau is degraded are authoritatively countered by this expert botanist's conclusion that the Plateau is a valuable high altitude climate change refuge on sandstone.

The proposed mining of 19 longwall panels under 2,638 hectares of Newnes Plateau will adversely impact on what the Colong Foundation calculates to be 22 nationally endangered swamps, including 6 shrub swamps.

The Foundation disputes the number of shrub swamps in the subsidence area with Centennial Coal, as five shrub swamps are clumped under the name Tri Star Swamp. These swamps contain potential habitat for *Eulamprus leuraensis* and *Petalura gigantea*. The former is state listed as endangered and later is a nationally threatened species.

The mapping scale presented in the EIS and detail of the description for these swamps makes it impossible to identify future damage that may relate to changes in plant communities. In the past, Centennial Coal has had difficulty identifying the death of Narrow, Junction and Wolgan Swamps, let alone subtle changes.

Centennial Coal must not be allowed to simply replicate the subsidence damage that it has already caused to nationally threatened upland swamps on Newnes Plateau for which it was required by the Commonwealth Government to pay $1.45 million in reparations. While the subsidence damage to some of the swamps was disguised by the eco-toxic discharges from LDP006 in the case of Angus Place Mine and from LDP004 and LDP005 for Springvale mine, there is strong evidence of damage to shrub swamps on the Plateau due to longwall mining related subsidence.

The lack of adequate swamp monitoring means that the opinions made by consultants, including those made by Goldney et al, 2010 (page 77, App. D, Vol. 2 of the EIS), are not strongly supported by facts.

The sandstone strata supporting the 22 nationally endangered swamps, and particularly the 7 shrub swamps, will also develop a large number of fractures. Centennial predicts these cracks to be 5 to 50mm wide and 10 to 15 metres deep. All these nationally endangered swamps will dry out due to lowered groundwater levels. The peat soils that support these swamps will then decompose. Over a period of years eucalypts and banksias will migrate into these dying swamps as they evolve into dry land communities.

Trail 6 swamp (NPSS) contains suitable habitat for *Petalura gigantea* (Pg) and *Eulamprus leuraensis* (El). LW1016 and LW1017 should be shortened in length to avoid this swamp, which is over a Type 3 structure. Trail 6 swamp is in a very similar position to Twin Gully Swamp which is protected but is not over any structure [Vol. 2, App. D – Drawing No MSEC593-07 Geological Structures (third last page in App. D)].

Carne Creek is currently in a pristine state, and its waters that flow through the Greater Blue Mountains World Heritage Area are of the highest standard. This creek was a key determinant in the location of the Emirates eco-resort. The extensive fracturing of sandstone associated with longwall mining under its headwater swamps will release high levels of metals, notably manganese and iron, polluting Carne Creek and making it run bright orange, just like the Wolgan River once did. Flows in Carne Creek will also become irregular.

All 2,638 hectares affected by the proposed longwall mining will be subject to surface cracking. Entire sub-catchments will be fractured to a depth of 15 to 20 metres. Surface groundwater aquifers

will become more permeable and interconnected. Centennial predicts surface aquifer drawdown to be 10 metres under ridges to 0.5 metres under shrub swamps. This range seems to be an underestimate as the longwall mining proposed at Angus Place Mine is more intensive than at Springvale Colliery, but the same degree of sandstone cracking and groundwater drawdown is predicted.

The mining footprint must be significantly lessened and mining methods reduced in intensity to protect Carne Creek, pagodas, cliffs and the nationally endangered swamps of the proposal area. Centennial Coal must be required to consider alternative bord and pillar mining methods for the proposed extension to Angus Place Colliery. Centennial's Airly Mine in the Capertee Valley operates to depth of 405 metres in the same geology, which includes bad mine roof conditions and many structural features. If Centennial can operate Airly Colliery as a bord and pillar mine, then it can also operate Springvale mine in this manner.

Please require Centennial to revise this proposal to improve environmental outcomes. Lowering the intensity of mining will avoid damage to Carne Creek, pagodas, cliffs and the many nationally endangered swamps that the current proposal puts at risk.

Future damage to Birds Rock Flora Reserve and also damage caused by the establishment of additional infrastructure

The Birds Rock Flora Reserve (as shown in Drawing Nos. MSEC593-01 and MSEC593-02) is considered by the subsidence consultant to be a 'significant natural feature' that is located within the Angus Place Extension Area. The potential impacts on this site include changes in surface water drainage, surface cracking, and fracturing and spalling of the exposed rock formations (Angus Place EIS, Vol 2, App D, pg 89). About 200 hectares of the Flora Reserve will be impacted under this proposal.

The purpose of a flora reserve is to conserve flora and fauna, and these reserves are the equivalent of IUCN category 2 – National Park. Some flora reserves in NSW have been inscribed onto the world heritage list of properties, for example flora reserves in the Central Eastern Rainforest World Heritage property. The Birds Rock Flora Reserve should be protected from predicted subsidence damage in a protection zone.

The proposed clearing of 14 hectares of forest for an additional ventilation facility is excessive and its proposed location close to the Wolgan River is unacceptable. In addition a further 9.25 hectares of clearing is associated with seven boreholes. The proposed construction of seven de-watering facilities will further fragment the public forest significantly adding to the infrastructure burden on Newnes Plateau in the Gardens of Stone reserve proposal.

Progressive rehabilitation undertaken by Centennial has proven ineffective and incomplete. Many tens of kilometres of access roads have not been closed and rehabilitated.

Regional Biodiversity Offset Strategy

The Director General's requirements (6/12/12) for the offset strategy requires Centennial Coal to develop 'An offset strategy, which is clearly quantified, to ensure that the development maintains or improves the terrestrial and aquatic biodiversity values of the region in the medium to long term' (App. I. page1, Vol 2 Springvale EIS). Centennial Coal and RPS have taken a miserly interpretation of this direction.

For critical review and analysis on the regional offset strategy, see the Colong Foundation submission for the proposed Springvale mine extension (SSD 12_5594).

Poor Consultation Processes with Non-Government Organisations

The Colong Foundation holds a different view to that presented in section 7.5.1 and especially Table 7.1. None of the Colong Foundation's concerns were properly addressed and after this process the Colong Foundation has not been approached by Centennial for a meeting in the last four years. Very few, if any, of the concerns raised by the Colong Foundation have been 'closed out' as suggested by Centennial in Table 7.1. The claim that 'Centennial will continue to consult and engage with these groups to achieve outcomes of the Consultation Strategy' has not been the Colong Foundation's experience in the last four years.

The Colong Foundation reiterates that that self-regulation and adaptive management does not work, as the regulator has a vested interest in finding no impact. The involvement of 'high profile NGOs' in Centennial Coal's self-regulation processes has had no effect on conservation outcomes. If high profile NGOs had some power in the regulation process, then there would be some possibility to influence these outcomes.

Recommendations

Two sets of hearings on the Angus Place and Springvale mining proposals should be held concurrently by the Planning Assessment Commission. The Commission should permit questioning of parties to these hearings regarding either mining proposal. The responses to these questions should be provided in a reasonable timeframe to permit all parties to submit a submission in reply if they so wish.

The mining footprint must be significantly lessened and mining methods reduced in intensity to protect Carne Creek, pagodas, cliffs and the nationally endangered swamps associated with these proposals. Centennial Coal must be required to consider alternative bord and pillar mining methods for its proposed Angus Place extension. Centennial's Airly mine in the Capertee Valley operates to a depth of 405 metres underground in the same geology. If Centennial can operate Airly Colliery as a bord and pillar mine, then it can also operate Springvale mine in this manner.

The proposed Angus Place mine extension should not be granted development consent unless:

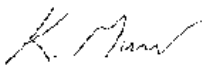
- Development consent is staged, with a review every five years;
- Consent is subject to performance standard triggers that ensure the health and integrity of receiving waters and heritage values;
- The consent is immediately reviewed if a performance standard trigger level is exceeded;
- Surface cracking of stream beds, under swamps or of pagodas, rock outcrops or cliffs is prevented;
- The intensity of longwall mining is reduced so that all nationally endangered swamps are protected – this includes shortening of longwalls 1017 and 1016 to protect Trail 6 swamp and shortening of longwalls 1004, 1005 and 1006 to protect the Tri Star Swamp complex;
- There is narrowing and/or splitting of longwall panels 1007, 1008, 1009 and 1010 occurs to protect Birds Rock Flora Reserve from fracture damage;
- There is splitting of longwalls 1013 and 1014 occurs to prevent damage to pagodas and cliffs;
- All proposed discharge of up to 43.8ML/day of mine effluent to the Coxs River via the Springvale-Delta Water Transfer Scheme (SDWTS) is treated by reverse osmosis technology to remove salt and metals to a standard that protects, the Coxs River, the downstream drinking water supply and near-pristine ecosystems in the World Heritage Area;
- In the event of a malfunction of SDWTS, such as following a bushfire, all effluent is reinserted underground into the mine and not allowed to result in emergency discharges to the World Heritage Area via Wolgan River or Carne Creek;
- Reinserted mine effluent is properly treated and not allowed to re-emerge in an unauthorised or unregulated manner;
- No emergence of near surface groundwater with elevated levels of salt or metal precipitate in Carne Creek is permitted;
- Representative sites for piezometers are chosen for the groundwater in swamps and streams by a third party agency;
- Monitoring guidelines clearly specify how the condition of groundwater dependent indicator plant species and the general condition of groundwater dependent ecosystems will be performed;
- All past tracks and trails created by Centennial Coal and its consultants, including those established by trail bikes, are recorded and plans set in place as soon as practicable to rehabilitate these trails as soon as possible as part of the rehabilitation program for this mine;

- Subsidence monitoring be performed by a third party agency, such as the Office of Environment and Heritage, and monitoring paid for by Centennial Coal;
- A comprehensive, systematic pre-mining stygofauna survey be implemented across the project area, with finer resolution taxonomic identification of stygofauna, to ensure that the diversity of stygofauna is properly assessed and potential risks determined;
- Monitoring of surface flow and near-surface groundwater creates a comprehensive picture of the sub-catchments affected by mining; and
- Monitoring of changes in ecosystem condition include well exposed, wide angle impacts of affected areas with GPS co-ordinates.

The Colong Foundation for Wilderness does not make donations to political parties.

Thank you for the opportunity to comment on this mining proposal.

Yours sincerely,



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