Submission to Independent Expert Panel

1. Context

Thank you for the opportunity to comment. The Georges River Environmental Alliance (GREA) notes the importance of this scientific inquiry as it essentially contributes to the knowledge base underpinning the conflict between water and coal. The only supply of potable drinking water for Southern Sydney, Wollongong and the Macarthur region (the Metropolitan and Woronora Special Areas) sit on the surface of the NSW Southern coalfields, source of some of the most valuable metallurgical coal in the world. Science should serve human interests and here is an opportunity to inform the conflict.

GREA has a firm and unequivocal position, and that is water is far more valuable than coal. We urge the scientific committee to place its scientific analysis in the real world socio-political context.

The NSW Chief Scientist in 2014 said; "it is important to recognise that many of these issues have a value dimension – that is, the features to be protected and the level of impact to be tolerated are not items that can be identified through a purely scientific enquiry. These are conversations that must be held with the community, in order for government to effectively balance the need for the economic resources of the Catchment with the ecosystem services it provides (drinking water) and the values of the land itself."[1]

GREA requests that this scientific committee goes beyond just having the "conversations" with the community and recognise and strongly advocate the position that it is in the longer term interests of society as a whole to accept that the value of the water resource is priceless and irreplaceable and worth more than coal revenues that may be forgone in order to ensure its protection. This position is not a novel one, and in fact echoes the finding of the Bulli Seam Operations (BSO) Expert Panel in 2010:

"The Panel is of the view that it is no longer a viable proposition for mining to cause more than negligible damage to pristine or near-pristine waterways in drinking water catchments or where these waterways are elements of significant conservation areas or significant river systems." [2]

That PAC panel quite uniquely and courageously melded rigorous scientific analysis with the determination of significance and acceptability in social terms. Thus it earnt for itself a level of public legitimacy, because it went beyond what could b e scientifically

[1] http://www.chiefscientist.nsw.gov.au/__data/assets/pdf_file/0007/44485/140530_SCA-Report-Final-Combined.pdf page 30.

[2] NSW PAC, BSO PAC, 2010, p. iv

determined and broached the subject of what was the appropriate balance between social, ecological and economic interests.

It also recognised that "deficiencies" in the scientific information base were "sufficient "to warrant a particular mining non-approval.[3] So following logically, we are asking that this expert scientific committee recommends to the government that since the stakes in terms of drinking water is so high, and mining damage to streams and swamps is known and so is viscerally apparent within drinking water catchments, any current information deficiencies, should not prevent a ban on any further mining in drinking water catchments. Such a ban is required. Further scientific inquiry needs to be re-aligned so that it is based on what can be gleaned without further damage being done.

Whilst the Southern Coalfield has been a 'real life laboratory', it should not be necessary to go on damaging precious and finite water catchments in order to monitor and collect data for the purposes of scientific knowledge accretion. That is not moral, prudent or wise. The institution of science and its inquiry needs to be bounded by common sense and its credibility with the knowing public needs to be maintained.

The 2014 report by the NSW Chief Scientist[4] noted the possibility of damage reaching a hypothetical tipping point, where the "collapse" of ecosystem services would fail to supply us drinking water. The potential for this or for any further threat to the functionality of the integrated ecological network of swamps and streams that deliver to our drinking water dams is unacceptable and thus the precautionary principle should be triggered, so as to halt any further mining in drinking water catchments. This view will be reflected we are sure in the majority of submissions you receive. The only reason why there is not more widespread public outrage is that these impacts are hidden away from public view, they are virtually invisible, and thus not public knowledge. Most people with common sense would be appalled to think they can't trust their government, nor their advising scientists, to protect drinking water above all else.

It is about time too, this panel decided not to hold knowledge in an elite sense confined to a particularly limited set of experts and publics, and recommends to the government that it should urgently provide greater Catchment inspection opportunities to the press and the public, so that more would then wish to be involved in the scientific debates around these issues that the scientific panel needs to hear.

I also do regret though a member of a mining Community Consultative Committee (BSO CCC), I was not invited to the meeting of this panel with community members of CCC's within drinking water catchments. As if I don't depend on that drinking water.

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[3] Ibid., p.iii

[4] NSW Chief Scientist & Engineer, "On measuring the cumulative impacts of activities which impact ground and surface water in teh Sydney Water Catchment, May 2014.

2. There is compelling evidence about mining induced damage in drinking water catchments.

The uncertainty argument is a furphy. Enough plausible evidence has been amassed to provide a sound case for the rejection of mining in drinking water catchments. We are persuaded by the following:

The 2016 Catchment Audit[5] found there was unquantifieid loss of surface flows occurring as a result of coalmining in the catchment. GREA is sufficiently alarmed by this to argue mining should stop. The fact that the losses are "unquantified" is a further worry but largely a distraction, as any loss is too much. In our dry continent, the Metropolitan catchments must remain in the best condition possible to provide sustainable water yields for growing populations into the future.

The "Height of Cracking Report"[6] found it feasible that there is a hydraulic connection between mine workings at Dendrobium and the Avon and Cordeaux dams. It confirmed seam to surface connected fractures, groundwater diversion and drainage and landscape disturbance causing fracture pathways from below the reservoirs. Damage to the upland swamps that store and release water to the catchment is occurring not just when they are above the longwall panels , but when they are as much as 900 m away. It has also been revealed that soil saturation has fallen below baseline levels in all swamp monitoring sites undermined or within 400 m of a longwall. The impacts of Dendrobium were greater than those predicted and approved. Water NSW noted the performance measures attached to Dendrobium approvals have failed to protect excessive consequences particularly as a result of longwall 9 and 10. GREA argues this thus this should extinguish the right of the miner to continue to mine.

Water NSW's submission to this inquiry said that subsidence caused by Dendrobium longwalls is "likely to be resulting in significant diversion of surface water which would otherwise contribute to Greater Sydney's water supply."[7] Similarly in relation to the Russell Vale UEP, another mine proposal in the drinking water catchment, its water losses would be unacceptable particularly in dry periods. It is simply time all these mining projects were permanently stopped.

3. Why residual knowledge gaps and uncertainty are no excuse for not protecting water supply as the precautionary principle should prevail.

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[5] Alluvium Consulting, 2016 Audit of the Sydney Drinking Water Catchment, 2017.

[6] PSM, Height of Cracking-Area 3B, March 2017.

[7] WaterNSW, Submission to the Independent Expert Panel on Mining in Sydeny Catchment, May 2018, p. 43

GREA notes that this scientific inquiry takes place within a continuum of such inquiries. In 2008 **the Southern Coalfields Inquiry** noted the levels of uncertainty and lack of baseline data, and each successive PAC and scientific inquiries for the next 10 years have noted the persistence of uncertainty. At the same time mining has continued unabated, doing damage, and never providing enough data.

Literature has noted that the field of knowledge itself will meet limits, there are some knowledge parameters that are in-determinant, complex, variable and inter-related and under these conditions uncertainty, ambiguity and ignorance will always prevail.[8]
In the BSO PAC the commissioners admitted flaws in trying to model and predict stream impacts as a consequence of valley closure and attributed reported unpredicted impacts and uncertainty to differences in rock type, rock fabric and structure and even the orientation of the feature in respect to the direction of valley closure.[9]

Moving along to 2018: The validity of the numerical, predictive modelling approaches, applied to assess surface and groundwater effects of mining induced subsidence in the Southern Coalfields, need further critical examination. The numerous deficiencies identified by Water NSW suggest a vote of 'no confidence' is justified. Identified deficiencies span a lack of stakeholder discussion, poorly specified objectives, and flaws in underlying assumptions, parameter values and boundary conditions. Quite ironically in the quest for greater specification, and sophistication, Water NSW claim plausibly:

"**The more complex a model becomes (approximately correlated to the number of parameters used), the great the uncertainty becomes"[10]**

So it seems in the 8 years of earnest efforts in this realm just canvassed, the situation may be worse in terms of predictive accuracy rather than better.

In terms of the cumulative loss of water, perhaps the matter of where surface water goes and ends up, when it disappears down mining fractures, and how much is actually lost will remain mysterious and contested riddles. This could well be the case no matter how many extra streams or swamps are sacrificed, with or without monitoring, whilst the hopeless pursuit of answers continues in a variable and heterogeneous landscape, with a kaleidoscope of stream and swamp types, configurations and connectivity's.

Lack of certainty should not be used as the excuse to avoid taking action to protect something as fundamental as drinking water supply. The Southern Coalfields Inquiry stepped beyond the limits of scientific investigation and argued for the application of the Precautionary Principle in 2008, the BSO PAC endorsed it strongly in 2010. No subsequent inquiry has come up with a better solution. **We support the theoretical proposition that**

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[8] D.J.C Skinner, S. A. Rocks & S.J.T Pollard, A review of uncertainty in environmental risk: characterising potential natures, locations and levels. Journal of Risk Research, vol. 17, iss. 2, 2014)

[9] BSO PAC, p. 47.

[10] Water NSW Submission to the IEP-1. Initial task, May 2018, p.18.

some knowledge remains elusive, some things remain unknown and in these circumstances precaution and damage avoidance is the best strategy. This applies to the drinking water catchments in question.

4. Imagining other directions for scientific investigation.

Precaution and damage avoidance represent the first condition of what is described as the "Mitigation Hierarchy" as an approach to achieve 'best practice' environmental management.[11] The others are 'harm minimisation', 'remediation' and 'offsets'. **Literature has reported failures in the efficacy and acceptance of remediation and off-sets particularly in global case studies and this is reflected in the view of the local community.[12]** In the case of the Southern Coalfields there is ample evidence of a shared lack of confidence in any of the current remediation efforts in the streams generally known, researched and reported including the Cataract River, the Georges River and Waratah Rivulet.[13]. There are no generally accepted remediation strategies known for upland swamps where the underlying bedrock base has been fractured. There is also an indecent delay between the damage being done, and the actual delivery of remediation programs, with serious implications for ecosystem functionality and thus water delivery dependent upon it. [14]

There is a place for scientific research to improve the healing of the now considerable expanse of damaged landscapes within the Metropolitan and Woronora water catchments. However none of that should build on any opportunity created by any new mining damage, as no new mining that might cause damage should be approved. That requires changing the nature of scientific investigations. What may be included instead are any research programs that monitor damaged sites over time and against reference sites, or that compare the performance of different remediation approaches and the degree to which functionality can or cannot be restored in ecosystems through either active intervention as opposed to the 'leave it alone' option.

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[11] S Brownlie and J Treweek, The Mitigation Hierachy and Beyond, (Chapter) 12 in R Gibson (ed) Sustainability Assessment, earthscan, Routledge, 2017, London.

[12] Ibid., and R Frodeman Geo Logic Breaking ground between Philosophy and the Earth Sciences State University of New York, 2003

[13] See critiques in the various submissions from agencies and the community to various PAC inquiries, and reflected in the expert panes reports including the BSO PAC (2010)

As a personal comment (S. Cullis) I have seen no visible improvement in the state of the Waratah Rivulet in my visit of 2018 after an earlier visit in 2014, and no improvement in the upper Georges River after its cracking, and so called remediation including crack grouting in 2003

[14] As a member of the BSO Community Consultation Committee, I am aware that damage done to the upper Georges soon after the expansion approval in 2012, has not been subject to any remediation program. I imagine this indecent time lag is being repeated in drinking water catchments hidden from the view of myself and others.

5. Why Adaptive Management has and will continue to fail.

The standard approval regime for coal mining is a Master Plan approval for 25-30 years into the future, and this is extremely unsatisfactory. **An approval for 30 years really provides no 'wriggle room' for adaptive management as new knowledge emerges.**

As the BSO PAC observed the legislative framework of the time, (and this aspect of it continues), meant that a mining approval for 30 years, would "turn off" and "extinguish" any protections for natural features and any right of "appeal" from third parties.[15] This would be despite the emergence of new knowledge and extreme damage scenarios, even beyond predictions.

A legal academic has observed in the NSW legal and mining context, that once a Mine is approved, the more detailed Extraction Plans (EP's), known also as Subsidence Management Plans, fail to protect the natural environment and reflect a "very high tolerance for risk".[16] The experience of myself, as a motivated member of a mining Community Consultative Committee (BSO-South 32), is I have observed up close the lack of mandated or invited opportunities for any public consultation in response to any of SMP's for the BSO or Dendrobium, with one exception. That was Dendrobium 3B, in the drinking water catchment as that matter was so controversial. There is no public confidence in the delegated authority to the Department of Planning and Environment (DoPE) to sign off on approvals as there is a strong community perception that this agency is, in a regulatory and cultural sense, captured by mining interests. **We believe at the very least, that the DoPE should not preside over the approval of any SMP/EPs in a drinking water catchment, and that process of approval needs to be democratized.**

The multiplicity of TARP's, EMPs SMPs, Environmental Licences and Conditions of Consent just become an overwhelming bureaucratic entanglement that confuse the public and regulators, and create a condition of inertia that constrains everything except the inevitability of mining which continues.[17] **A simple ban on damaging mining based on precaution is the best alternative.**

Adaptive Management can be flawed and is particularly so when applied to mining.[18] Research has revealed it can work were monitoring is good, and quick turn abouts in

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[15] BSO PAC, 2010, p.iii.

[16] N. Graham, pp. 133 & 141.

[17] Whilst outside the water catchment, but his case would be similar for any project within it, for the Bulli Seam Operations, there have been 6 Approvals, 8 EPL's, 14 Development Consent Management Plans and 5 SMP's and numerous other documents that need to be considered.

[18] L. Gunderson, Resilience, Flexibility and Adaptive Management- -Antidotes for Spurious Certitude? Conservation Ecology 3(1): 7, p. 6, viewed on 19/1/18, http://dlc.dlib.indiana.edu/dlc/bitstream/handle/10535/2472/http__www.ecologyandsociety.org_vol3_iss1_art7_.pdf?sequence=1; C. R.Allen & L. H.Gunderson, Pathology and failure in the design and implementation of adaptive management, Journal of Environmental Management, Vol. 92, Issue 5, May 2011, pp. 1379-1384.

harvesting methodologies and scale of operations is possible. This is most achievable in forestry and fishing and where the primary objective often held by a 'public interest' driven manager is to maintain ecological integrity and long term sustainable yields. Longwall mining is built on a shaky knowledge base, its huge juggernauts cannot be easily turned around or deconstructed and it is controlled by corporations who are not driven to protect ecological integrity or long term intergenerational equity, but rather by the short term imperative to maximise return to its shareholders.

6. Conclusion and the Terms of Reference (ToR)

The approach of this submission has been to integrate the concerns for the Dendrobium and Woronora catchments (ToR. 1) within a wider discussion of the metropolitan catchments and the Southern Coalfields. References to the various nominated reports have been made through-out.

A consideration of Risks (ToR. 2) to swamps streams and the cumulative yield of water to the drinking water catchments has been fundamental to the discussions of various management options like remediation, offsets and adaptive management. Our case is that this Panel should advocate for precaution and a ban on mining in the drinking catchments and that this is essentially the advice that this Panel should make to the Department of Planning and the Environment, and its Minister (ToR 3).

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