

Vickery Coal Mine Expansion IPC Submission.

Commissioners, as you are aware water in all its forms is my main concern, this concern was increased when I read in one of the Reports prepared for the NSW Department of Planning and Environment that the water in the final void will eventually, quoted 1000 years post mining, become so saline as to render the water unsuitable for Agricultural use. This is only one of the concerns raised in this report.

I have heard all these long time frames before, with the local gas industry, only to have the long term "shortened". I have also heard that that industry will have no effect on the waters of the Great Artesian Basin (GAB) only to have that statement revised a few years later. I wonder if it was known all along but kept from public release?

I am only stating what I know from my years of dealings with the extraction Industry, and I do not apologise for using examples outside of this Mine.

As quoted in my submission, Santos stated that their operation in the Coal seams will have an effect on the Groundwater resources of the Gunnedah/Oxley Basin (GOB). Well this mine is also extracting water not only from the coal seams, but from a groundwater bore field that is in the upper groundwater regions of the GOB as well as being most likely on the Alluvial Plain of the Namoi River.

This then creates a number of problems to many different Agricultural enterprises downstream, both the irrigation industry of the Lower Namoi and the cropping/irrigation industries of the Liverpool Plains, as well as locally around Gunnedah and neighbouring regions. If the Mine is granted a secure water licence that is higher than the Irrigators then the Mine will take that water and others will miss out, so there could be a case where one industry goes while another survives. I know which one I would choose and that is the long term Agricultural and Irrigation. Coal mines like most extractive industries ride a relatively short-term boom/bust life.

I have concerns regarding the final void. Ground water is a dynamic fluid; not only does it move up and down but sideways as well. The Narrabri Shire Council's submission notes that groundwater **will** flow into the final void, however, the Whitehaven Vickery EIS states that it will **not** flow out. How can the proponent be so certain their interpretation is correct?

The Namoi Water Study has a table of rock strata in the region, this table clearly shows that the geology of the region does transmit groundwater.

Already one local resource company has had to admit, all be it begrudgingly, that their project by extracting water from the coal seams of the GOB will lower the ground water in the Southern Recharge area of the GAB even though there is an aquitard strata between the two basins.

We all make mistakes and misread information.

Surely, it can be deduced that if you cut through a groundwater aquifer system you end up with two ends; one called the "in" and the other the "out", and sometimes and in some circumstances, they can both be either in-flowers or out-flowers. The way the groundwater flows depends upon Geology and the level of ground water. If one end is connected to the Namoi River, and there are many groundwater streams connected to that River, then the water from the Namoi at certain times will flow into the final void. Likewise, when the final void is higher than the Namoi river the water with its salts will flow into the Namoi river from the void, thus raising the salinity levels in the river water.

The 1000-year time quoted, and I doubt if it will be that long, is the supposed time it will take to reach the 14000mg/L level, but how long will it take to reach say 7000 mg/L which is a point where irrigation will start to be majorly effected.

Then there is the problem with the salts from the water in the final void being carried, airborne by wind and heat, from the site and being deposited on the Agricultural and Forest land. These salts will eventually affect the Agricultural capacity of the area and to a distance, unknown, beyond. These salts will affect the soils and

vegetation growth in the near-by State and other Forests/Recreational areas.

The ponds that contain the water/salts removed during mine production will not only effect the local area as described above, but their weight will have a profound effect upon the geology, permanent water retention within the underlining strata and groundwater flow rates and directions.

I have a problem with the reliance on “models”. A Model is only as good as the information fed into it and the person feeding it in, and without long term “in field” gathered information the data going into a Model will always be suspect as will the predictions that come from that Model.

As if to prove this point, DoI Lands & Water have just released their plans for more groundwater Monitoring bores in the area, one of which is located near the Blue Vale Mine on Blue Vale Road (**attachment 1**). This will become interesting should the Vicky Expansion be approved and the road closed. This information was provided to the Narrabri Gas Project CCC on the 29<sup>th</sup> November 2018, to which I am a Delegate for People for the Plains.

Commissioners I have to wonder at the quality of any Geology Report contained in the Vickery Expansion EIS, given that the Well Completion Report for DoI Lands & Water on the Plumb Road Monitoring Bore nest (**Attachment 2**) states that there is **NO CEMENT** found in many of the geological layers located in what is called the Pilliga Sandstone, as well as Argillaceous Sandstones. Simply put these areas are unconsolidated; compressed yes, but not as yet solid rock, so they will have a different groundwater flow rate and a different trapped water coefficient (Wills-Biot (**Attachment 3**), as would any Argillaceous strata, certainly one groundwater flow rate does not fit all the geological strata nor can it be said that there are fixed directions, vertically and laterally, of any groundwater flow.

In the case of the Plumb Road Bores, located to the West of the Expansion, it is not until geological depths are greater than 150 metres that the ‘cemented sandstones’ are in dominance. It must also be pointed out that the type of cementing material, mineral or bacterial, as well as the grain size of the material that makes up the “geological rock” has a profound effect upon the ability of that ‘rock” to trap and permanently hold ground water as well as being able to allow the passage of groundwater through it.

There are just too many scientifically unexplained geological strata variables which affect groundwater flow as well as the way it moves, even heavy surface weight such as trains, bridge pylons, water storage dams, waste soil mounds, etc., which can influence groundwater flow and permanent water retention within a geological strata (**Attachment 4**), for the information provided in the Vickery Expansion EIS to be accepted.

At this point I must point out that those locals who rely on groundwater for either Agricultural or just for Stock and Domestic use have always had a basic understanding of how the groundwater moves within the geological strata, this knowledge was gained through experience and necessity, but yet to date their knowledge has been totally ignored. Likewise it can also be said the Science is catching up with knowledge of the locals.

So all this puts the material on the subject of local Geology and groundwater flow rates as found within the Vickery Expansion EIS, under suspicion. Geology consists of many layers all different and as such cannot be lumped into one all-encompassing heading.

The Vickery Expansion Geology Reports should be done again and with the due diligence to the actual nature of the strata below and adjacent to the expansion area.

Groundwater Dependant Ecosystems such as Stygofauna and bacteria such as Sulphate Reducing Bacteria, are very important not only because they are a filtering medium, but because they can provide an early warning on water quality as these ecosystems and the animals that inhabit them rely on a very narrow water quality range. Alter that quality range too much and the ecosystems die out and bacteria become predominate. I did not see any continuous study being done to establish their existence, spread or importance in the Vickery EIS.

These ecosystems and the role they play in groundwater quality are too important to just ignore. My suggestion is that more thorough and ongoing work should be done on this and other subjects mentioned in this verbal submission.

Commissioners, once the groundwater and/or the groundwater ecosystems have been affected, then it is next to impossible to repair or return these to their original condition, and this could happen if proper, thorough and long term studies into the effects of this mine, in conjunction with the other existing mining/extraction developments in the region and associated basins, are not carried out both in desktop and "In field" modelling prior to any approval for this expansion.

These important recent studies were carried out by DPI Water NSW and the Independent body GISERA, as described above and below, with the findings compared to the data and predictions from the Namoi Water study which was the last complete study done into the combined effects of Mining/Gas on all areas of and adjacent to the Namoi Valley.

The Namoi Water Study which was finalised in mid-2012 had no powers to make recommendations and is now getting dated with respect to some of its findings. Some findings are still current and are backed up by the **"CSG-induced groundwater impacts in the Pilliga region: prediction uncertainty, data-worth and optimal monitoring strategies -W8 "GISERA Report of August 2018 (Attachment 5).**

It must be pointed out that the findings of W8 were mainly based on Desktop modelling and information provided by one company and one NSW government water monitoring body; little to no "in field" work or checking of provided data was done.

The effects of Mining projects of all types, coal and gas, cannot be looked at in isolation, they do have a cumulative impact on groundwater and surface water across all the adjacent basins.

In my opinion the Chief Scientist should do a Report on the overall effects of the Coal Industries similar to the one carried out on the Gas Industry and make recommendations that have to be met prior to any more increase in Coal Mining activity and certainly before this Open cut expansion is approved.

Why am I addressing this IPC and mentioning all this? Simple really – my property located to the northwest and in another water basin, is in an area which the models of both the Namoi Water Study and the GISERA W8 studies show will have an anticipated water table drop (0.2-0.5m indicated) which is larger than that predicted for most areas (0.2m) and I am concerned that this Vickery Expansion will add to that figure if increased ground and surface water extraction and aquifer interference occurs should this mine expansion be approved **(for more information see Fig. 7.63 in the Namoi Water Study, and Fig 16. 95 percentile in the GISERA W8 Report and associated sections, and possibly up to 1.0 m see Fig 18. Also the Google Map image showing my property in relation to the Vickery Expansion, Attachment 6)**

On another note not related to groundwater, I do fly-overs of the gas and coal activity areas in the region. The way I find the open cut coal mine at Boggabri is to head for the dust plume. Every time I have gone up there is always a big dust cloud with a downward trail in a southerly direction from the Narrabri airport, yet when you reach those mines the dust levels are light and do not effect photography. Dust is certainly rising off those mines and being carried to who knows where to do who knows what to the air/lung breathing populations and to the soils where it falls.

I fully expect that the Vickery Expansion will have the same noticeable plume should the expansion be approved.

In conclusion I would like to say three things:

1. - A fix on-the-run is not a permanent fix of a problem.

And

2. - Why did the NSW Government spend a lot of money doing the Namoi Valley Water Study, which looked at the total combined effects of Coal and Gas extraction on the ground and surface waters within and adjacent to the Namoi Catchment and areas known as the Pilliga Sandstone, when it is becoming increasingly obvious that the EIS's are only centred on the effects of one project and not the increased contribution caused by a new or expanded project to the combined effect that may be felt by the whole of the Namoi Catchment area?

And

3 - I would just like to make my stance on mining clear

"I AM NOT AGAINST MINING PROVIDED THE FOLLOWING ARE DONE

1 THERE IS RESPECT FOR ALL ASPECTS OF THE ENVIRONMENT Air-Water-Soil, INCLUDING NATIVE FAUNA and FLORA AND ESPECIALLY ANY MIGRATORY SPECIES as well as GWE's

2 THERE IS RESPECT FOR THE PEOPLE especially those IN AND ADJACENT TO THE AREA WHERE YOU OPERATE AND THIS INCLUDES FULLY AND RESPECTFULLY ANSWERING ALL QUESTIONS THAT THEY MIGHT HAVE.

3 THERE IS RESPECT FOR THE LAWS OF THE LAND AND LOCAL REGULATIONS (COUNCILS) AS WELL AS FOR THE CONDITIONS OF OPERATING CONSENT.

IF YOU CANNOT DO ANY OR WANT TO TRY AND CIRCUMVENT ANY THEM I CANNOT APPROVE OF YOUR ACTIVITY"

Thank you for your time.

Mr A J Pickard

Narrabri

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Attachments as indicated are included on Disc.

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