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NSW Government Planning & Infrastructure
GPO Box 39
SYDNEY NSW 2001

Attention: Director Mining and Industry Projects
Re: Watermark Coal Mine
App No.: SSD - 4975, Watermark Coal Project

Name: Dr Pauline Roberts
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Disclose reportable donations: I have never made a reportable political donation.

Privacy Statement: I have read the Department's Privacy Statement and agree to the Department using my submission in the ways it describes. I understand this includes full publication on the Department's website of my submission, any attachments, and any of my personal information in those documents, and possible supply to third parties such as state agencies, local government and the proponent. I agree to the above statement.

I am a member of the Caroona Coal Action Group and SOS Liverpool Plains. I object in the strongest terms to the proposed Shenhua Watermark Coal Mine at Breeza NSW. As to the EIS, which represents the only input a community member can have over this kind of polluting, industrial project, I find myself commenting on how the EIS should be improved which suggests tacit agreement with the project proposed. So, to reiterate, I do not give my approval to this mine or the current process involved in granting mining licences in NSW in any sense. However, I do appreciate that if submissions are not made, the current woeful inadequacies of the EIS will just be part of the political rubber-stamping that is the granting of a mining licence in NSW. I only hope that the Federal Government's EPBC Water Amendment Bill passes shortly, and common sense, with regard to our precious water resources here on the Liverpool Plains, and elsewhere, can finally prevail.

Caught therefore between 'the devil and the deep blue aquifer', I have reviewed the submissions prepared by Earth Systems for the Caroona Coal Action Group (CCAG) and that of Soil Futures Consulting for SOS Liverpool Plains and I am writing personally in support of both of their submissions.

I hope that the lack of any Social Licence to operate a mine on the Liverpool Plains will also be taken into account. Five communities in the area have voted overwhelmingly (>95%) to be coal and coal seam gas free. This is grass roots democracy in action from people who are already producing high quality food products for the people of Australia and have a vested interest in preserving the soil , water supplies and ecosystems of the area. They would like to continue to

feed Australians using their skills in an unpolluted and unindustrialised rural agricultural landscape for centuries to come.

1. Water – quantity and quality

In his recent Paper to all Federal and State Government MPs, Peter Serov, previously a senior researcher at the Office of Water with a speciality in *stygofauna, (the equivalent, environmentally of an 'aquatic canary in the coal mine water')*, wrote:

" I am deeply concerned by:

 the almost complete lack of science currently being conducted into groundwater ecosystems in Australia, and New South Wales in particular;

 the lack of science and environmental baseline monitoring that is being conducted by the government and industries prior to the approval of major developments that cause substantial aquifer interference;

 the lack of general environmental understanding by decision makers in relation to groundwater, its ecosystems and it's connectivity throughout the landscape;

 and the lack of appreciation of groundwater's ecological functions and conservation value."

[Reference: Servov, Peter, "The Lack of Discussion on the Loss of Groundwater Ecosystems to Mining Industries." 2013, full text appended at end.]

The EIS for this industrialisation project does nothing to allay this professional's concerns, nor those of the wider community. Surface and underground water supplies are too precious to put at risk anywhere, let alone somewhere that reliably produces food for all Australians, often two crops a year. This EIS contains many discrepancies with respect to water and cumulative impacts on surface and sub-surface supplies and many unproven suppositions with respect to connectivity underground that have not been proven scientifically. The surface water benchmarking is wholly inadequate and suggests a fundamental lack of understanding with respect to water quality requirements (as presaged by Peter Serov). Many of the models used are unproven in this kind of flood plain scenario and the mine planning and development based upon these kinds of models have been called into question after 'rain events' in central Queensland.

What is going to happen when an 'unusual rain event' – *unusual* it seems to only miners not locals, sweeps toxic mine waste across thousands of hectares of crops? Who will pay for the contaminated food and landscape? Where is such provision for compensation in the risk analysis and clean up of contaminated soil? The Queensland government seems to have used "*the solution to pollution is dilution*" as its mantra with respect to mine waste flooding into rivers after heavy rainfall, and has been heavily criticised for such a lax environmental attitude after impacts on

down-stream ecosystem and residents' health. Such environmental vandalism might, sadly, be acceptable in Queensland but surely not on the food producing Liverpool Plains of NSW.

Indeed, the proponents of this mine clearly intend to discharge waste water if "*a rainfall event [that] exceeds the design capacity of the sediment control systems"* [occurs] and since history shows us these mine problems do occur, and regularly, the EIS should address what the mine proponents intend to do about the contamination thereby caused. Ringing up the EPA for a variation to their pollution licence should no longer be considered an option.

In addition, what confidence can we have in the validity of the "*mine water balance models*" if quantity assessments are questionable and there is no proper assessment of quality other than for salinity? Where are the models for heavy metal and radioactive contamination in our water, soils and air from this mine? Where are the models that discuss the effect, longevity etc of mono- and poly-aromatic hydrocarbon contamination and other common contaminants of coal? What are the standards for water quality in this country when it comes to mine waste water and how are they enforced? There is far too much emphasis on quantity here – although in water rich areas such as the Liverpool Plains clearly this is important - but these models and assessments need to include a full suite of *quality* considerations and the full, cumulative impact of toxic material exhumation on water supplies.

It is not to say that salinity (ie. mainly sodium chloride) is not an issue in this EIS, it is, and farmers have worked very hard on the Liverpool Plains to minimise impact of rising salinity. It is rather depressing to see industrialisation alter this delicate balance once more when salinity in the Murray Darling Basin is already a key threat to agriculture down stream of the Namoi catchment.

It really is about time this country got serious about its water supplies. As has been pointed out many times over the past 6 years at State and Federal level, coal is not just carbon but by its very nature it has many inorganic and organic minerals and compounds associated with it, many of them toxic to all branches of our ecosystem and especially *aquatic* ecosystems. This wilfull contamination via coal extraction can not be underestimated yet nowhere in the EIS is this fact ever even mentioned. Nowhere in the EIS is consideration made. Why is this the case? Are the proponents out of date? Do the coal chemists not know the composition of the seams to be mined? The community deserves to hear the full story of \each seam's coal chemical make up, this is not rocket science and the data should be made available and for comment. How can an assessment as to Environmental Impact – especially to water systems - be made without these data? This is a serious omission and not one that should be covered by Commercial in Confidence due to its ultimate impact on the environment and water supplies.

If Farmers on the Liverpool Plains can undertake their own, comprehensive, baseline groundwater monitoring (far in excess of that undertaken by the EIS proponents) because they are so concerned for their water supplies and appreciate that, in a court of law, evidence before the fact counts, why can not a Chinese government-owned corporation undertake the same? Why is comprehensive, on-going water testing not a feature of the EIS so we know the quality of the supplies the NSW Govt is proposing to contaminate?

And my final question on this area, should rigorous standards be put in place, who from government will be there to ensure compliance? If the Hunter Valley and the sad state of the Hunter River is anything to go by, it will all be self-regulation and self-compliance at the mines due to the shortages of government technical staff to actually oversee the 'standards' set. Nowhere in the EIS or the planning process is regulatory oversight truly addressed, and until it is, compliance with any of the conditions is largely either by whistleblowers, community activists or wishful thinking. This makes a mockery of the EIS, unless it is just intended to be a paper exercise.

2. Health Impacts

The NSW Government says it will "*develop a cumulative impact assessment methodology to manage the cumulative health and amenity impacts of mining and coal seam gas proposals*" within a timeframe of March 2013. What does this mean? Is this methodology open to public scrutiny and comment? So far despite 6 years of campaigning, NSW government seems unable to act to cover coal trains to prevent dust contamination. Will this environmental impact be part of this methodology? Does the NSW government actually finally intend to monitor PM2.5s which cause many of the human and animal respiratory problems associated with mines in the Hunter Valley rather than the less-lethal PM10s? Where in the EIS does it discuss the particulate matter impact of burning hundreds of thousands of litres of diesel fuel 24/7 during open cut mining operations? How can the EIS Social impacts section be taken seriously if none of these impacts has been attended to after years of complaints from current mining communities in the Hunter Valley and elsewhere? Where is the base-line data for soil, air, surface water, ground water, tank water quality now before any industrial activity is allowed to take place. Bench marking should be at least 2 years before any operations start to allow for consecutive data points.

The 'negligible health impacts on animals' discussed in the EIS is laughable. Where is the rigorous testing, where is the data to support these claims? Where is the analysis of milk and meat from these animals farmed on mining land using a full range of contaminant testing? A community which prides itself in the quality of its meat and grain deserves to see the data to support these unlikely claims. A quick review of National Pollutants Inventory tables for Singleton will show what toxic contaminants should be checked for.

3. No social licence

There are certainly question marks regarding the proposed biodiversity offsets and the very idea that one area can be 'swapped' for another is somewhat simplistic and hopeful. What is also to be done about the human biodiversity loss and the massive demographic change that will occur if the area changes from agriculture to mining industrialisation? Where in the EIS does it take into account the overwhelming rejection of this mine by the people of the area who will be affected the most? If social impact is at all important, why has this application been allowed to progress this far despite continued and concerted community opposition via rallies, State and Federal parliamentary delegations, petitions, hundreds of submissions, letters, petitions and appearances by local people at Select, Standing and Senate committees? I would like an explanation of that point.

Once again I strongly object to coal and coal seam gas mining on the Liverpool Plains. I hope that the NSW government has the foresight and integrity to reject this proposal outright.

Dr Pauline Roberts
02 6721 3667

Appendix.

Re: The Lack of Discussion on the Loss of Groundwater Ecosystems to Mining Industries.

By Peter Serov (02) 67711458

15th March 2013

To Whom it May Concern.

Re: The Lack of Discussion on the Loss of Groundwater Ecosystems to Mining Industries.

I am writing to you to express my deep concern for the loss of the unique species and ecosystems that rely on our groundwater resources that is being caused by poor management practices and attitudes from both industry and Government alike. These ecosystems and species are generally not seen or their connections with groundwater understood but they have high biodiversity value and perform a vital role in maintaining groundwater flow and quality.
I am deeply concerned by:
 the almost complete lack of science currently being conducted into groundwater ecosystems in Australia, and New South Wales in particular;
 the lack of science and environmental baseline monitoring that is being conducted by the government and industries prior to the approval of major developments that cause substantial aquifer interference;
 the lack of general environmental understanding by decision makers in relation to groundwater, its ecosystems and it's connectivity throughout the landscape;
 and the lack of appreciation of groundwater's ecological functions and conservation value.

Groundwater constitutes an estimated 97% of all non-frozen freshwater on earth and supports a vast range of ecosystems that cover a large percentage of the landscape from the coast to the mountain tops. These include: unique subterranean communities (stygofauna) including caves and aquifer ecosystems; most rivers; wetlands; native

vegetation; and even marine and estuarine environments. Groundwater dependent ecosystems (GDEs) are reliant on the high water quality and consistency of groundwater levels and pressure to survive. In turn, these ecosystems provide a huge range of environmental services that benefit the environment and ultimately, us. These communities also contain many highly sensitive, specialised and highly localised, endemic flora and fauna that cannot be found elsewhere and have little tolerance for change. They also include species that represent remnants of ancient environments as well as many living fossils. The uniqueness of Australia's biodiversity is encapsulated and magnified tenfold by its groundwater dependent biodiversity.

Background

I am a professional freshwater/groundwater ecologist with nearly 30 years of experience in the field. I have worked in all states and various government agencies including museums, universities and regulatory government bodies for much of that time. Until recently I was with the NSW Office of Water (15 years) where my main job was the identification, risk assessment and ecological valuation of groundwater ecosystems across New South Wales. This project was conducted in order for the department to fulfil its obligations to manage Groundwater Dependent Ecosystems (GDEs) under the Water Act 2000, the NSW GDE Policy and other legislative requirements. A component of this project was providing advice to the Major Projects Unit on groundwater ecosystems and the potential impacts from various developments. One of the final products of this project was the development of a groundwater ecosystem environmental risk and ecological valuation guidelines document co-written by a colleague from the Office of Environment and Heritage and myself (Principal author). This was developed to be used by the government for determining the current and future ecological values and risks to groundwater and the environment from various developments including mining. The document is entitled "The Risk Assessment Guidelines for Groundwater Dependent Ecosystems" and was published by the National Water Commission to providing guidance on the protection and management of GDEs. It sets out management objectives and principles to:

- ensure that the most vulnerable and valuable ecosystems are protected;
- manage groundwater extraction within defined limits thereby providing flow sufficient to sustain ecological processes and maintain biodiversity;
- ensure that sufficient groundwater of suitable quality is available to ecosystems when needed;
- ensure that the precautionary principle is applied to protect groundwater dependent ecosystems, particularly the dynamics of flow and availability and the species reliant on these attributes;
- ensure that land use activities aim to minimise adverse impacts on groundwater dependent ecosystems.

This document was enthusiastically endorsed by the Federal Government (National Water Commission) and from experts in the field from around Australia, and yet has had no publicity or support within NSW Government. Unfortunately, the actions and attitudes of the current government and responsible departments have meant that **these objectives and principles have not and will not be met**.

Impacts of Groundwater Extractive Industries

The one issue that has been completely overlooked by the politicians, environmentalists, farmers, the media as well as the Scientific Panel set up to assess the impacts of the Coal Seam Gas (CSG) Industry, is the impacts of mining in general, and CSG specifically, on groundwater ecosystems. While there has been concerns raised by many about the massive increase in mining and CSG industries and subsequent concessions given to groups with a monetary concern and strong lobbying power such as the farmers about prime agricultural land, horse studs and vineyards**, there has been almost no comment made about (and no concessions given for) the impact of these activities on groundwater dependent ecosystems or the environment in general.**

These ecosystems make up a large component of all environments across the landscape. They are also very sensitive to environmental change, are the ideal 'Canary in the Mine' indicators of such changes and have been used by others states for over a decade to manage developments, particularly mining.

One of the reasons groundwater is not appropriately represented in the current debates is the lack of general understanding and education of what groundwater is, how it functions or the ecosystems it supports. Groundwater in an aquifer is body of underground water but it is not isolated or stationary. Neither is it devoid of life or an inexhaustible supply of clean water. It flows in much the same way as a river from its surface recharge zone to its surface discharge areas and will transport impacts such as pollutants or reductions of quantity throughout the subsurface environments to the surface land and waters. Therefore, **there is always a flow-on effect from one point of impact on the groundwater quantity or quality to the rest of the landscape**. The repercussions of this reality are wide ranging, long lasting, and in many cases irreparable.

The parameters that make groundwater a separate entity to many surface water environments and which has contributed to the development of many specialised, highly endemic ecosystems, communities and species, is the relatively

consistent nature of its flow, pressure, level, and water chemistry. For example, constant groundwater levels support many wetlands, caves, rivers and tree communities, constant pressure supports the unique Mound Springs of the Great Artesian Basin, and high quality, consistent water chemistry supports a vast array of subterranean species and communities with most being new to science. The environmental impacts of current and future developments in the mining industry are multi-facetted, complex and pose enormous environmental risks that have not been adequately considered either for their short term, local or long term, broad scale, cumulative impacts.

Current Legislation

The other troubling issue is the lack of interest or commitment by the NSW State Government to comply with its own legislation and policies requirements. The NSW State Government has an obligation under the WMA 2000 and the Groundwater Dependent Ecosystem Policy to (excerpt from the WMA and GDE Guidelines – see attached) "manage GDEs in such a way that it:

 applies the principles of ecologically sustainable development;
 protects, enhances and restores water sources, their associated ecosystem, ecological processes and biological diversity and their water quality;
 integrates the management of water sources with the management of other aspects of the environment, including the land, its soils, its native vegetation and its native fauna;

The *Water Management Act* 2000 also provides water management principles that are relevant to the management of GDEs:

 water sources, floodplains and **dependent ecosystems (including groundwater and wetlands**) should be **protected and restored** and, where possible, land should not be degraded;
 habitats, animals and plants that benefit from water or are potentially affected by managed activities should be protected and (in the case of habitats) restored;
 the quality of all water sources should be protected and, wherever possible, enhanced;
 the cumulative impacts of water management licences and approvals and other activities on water sources and their dependent ecosystems, should be considered and minimised;
 the principles of adaptive management should be applied, which should be responsive to monitoring and improvements in understanding of ecological water requirement.

Many groundwater ecosystems are not currently protected or even considered in NSW, even though the policies and rules are there and much research has been conducted to identify and highlight their importance to landscape and groundwater health. In fact, NSW was once ahead of all other states in the development of Groundwater Dependent Ecosystems research, policy and management, however, this has not been the case for many years. Retrograde government attitudes have shifted towards groundwater resource development at all cost rather than sustainable management of the resource for the environment or future use. There has been a progressive and intentional reduction in government funding, staff and resources resulting in the groundwater dependent ecosystem project ceasing to exist in any capacity. This shift has meant that the intent of the GDE Policy has been watered down to be effectively toothless, meaningless and completely ineffective for the sake of economic progress and convenience.

The recent concessions given to the powerful lobby groups of a 2 km buffer zone around residential areas, horse studs, vineyards and prime agricultural lands has nothing to do with science and everything to do with politics and money. These concessions however do not go, in anyway, far enough to protect the on-going integrity and functioning of the aquifers as there has been no mention anywhere of protecting either current prime conservation lands such as National Parks and nature reserves or individual high conservation value groundwater ecosystems (as outlined in the GDE Policy and Guidelines). In addition, the buffer zones that have been offered only protect the landowners from localised drawdown of their water supplies. It does not protect them from regional groundwater declines resulting from large scale aquifer interference activities or from changes in water quality resulting from modifications in aquifer connectivity's or direct pollution from industry.

Other states such as Western Australia have actively acknowledged the importance of groundwater and its associated ecosystems to the environment and have been protecting their GDE's for over a decade through a range of policies which are enforced. They have also been using their groundwater biodiversity as an asset to be valued by the community and as a monitoring tool to successfully regulate major developments such as the mining industry. I call for the same consistent approach for the protection, conservation and appropriate ecological management of our high conservation value aquifers and individual groundwater ecosystems Australia wide. I also call for the establishment of aquifer conservation reserves for the protection of aquifers with high conservation value subterranean and surface biodiversity for exactly the same reasons that we have preserved wetlands, National Parks and Marine reserves. Those reasons are to preserve our unique biodiversity for its own sake and to have a functioning environment for now and tomorrow for the benefit of all, not just a few.

Conclusion

Finally, the Federal Environment Minister, the mining industry and the State Government keep pointing out the importance of job and revenue creation through aquifer impacting industries but there has been no consideration of the importance of sustaining our biodiversity or a functioning groundwater system for the environment and our rural populations. The future cost to the environment is not considered at all. What price do we put on the quality and quantity of our groundwater sources and the ecosystem they supports and that supports us, particularly after the jobs and industry has left and the resource is unusable? If we manage the resource and the ecosystems appropriately now by protecting the resource (in terms of water quality, quantity and biodiversity) by investing in long term measures to detect detrimental changes in each parameter before a negative impact occurs then the relative costs to industry, government, the environment, and society will be tiny and the resource will continue. Compare this to the enormous financial, health, productivity, and emotional cost that would result from leaving the problem to be fixed (if possible at all) at some date in the future once the damage had been done. In most cases, once these unique and specialised environments, species and the functions they perform and the resource we rely on, has been lost we won't able to replace them or repair the damaged aquifers.

Thank you for the opportunity to present these concerns to you and for your consideration of these important issues.
Yours Sincerely

Peter Serov