Submission
No 333

INQUIRY INTO COAL SEAM GAS

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The Wilderness Society NSW

Submission to the NSW Upper House Inquiry into Coal Seam Gas

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Thank you for the opportunity to provide input into the inquiry into coal seam gas currently being conducted by the NSW Legislative Council's General Purpose Standing Committee No 5.

Coal seam gas exploration and extraction poses a new and unknown threat to our natural environment and native wildlife. This submission outlines The Wilderness Society concerns in particular regard to the:

1. Effects on ground and surface water system
2. Effects related to the use of chemicals
3. Effect on Crown Lands including travelling stock routes and State Forests
4. Effects on our natural environment and biodiversity
5. Effects on rivers and wetlands
6. Nature and effectiveness of remediation required under the Act
7. Effect on greenhouse gas and other emissions

Please accept the comment on the environmental and health impact of CSG activities as follows:

1. **Effects on ground and surface water system**

Ground water

The huge amount of dewatering of the coal seam aquifers which is required in the gas extraction activities may cause significant losses in pressure and the disruption of the hydraulic conditions within aquifers potentially beyond the gas field boundary [1]. Up to 350,000 ML of groundwater per year (about two-thirds of Sydney Harbour) is expected to be extracted by the coal seam gas industry. Water supply for other usage will be depleted, and moreover, excessive groundwater pumping has been known to result in permanent subsidence and related ground failures [3]. Whilst progress is being made in NSW through the implementation of the *Strategic Regional Land Use Policy and Draft NSW Aquifer Interference Policy,* there are currently no laws to limit the amount of water extracted; and CSG companies are exempt from complying with the Great Artesian Basin Resource Operation Plan [3].

Another serious concern related to groundwater is inter-aquifer transfer due to drilling and the subsequent mixing of groundwater from different strata. This risk needs to be considered particularly for basins consisting of multi-layered, confined aquifer systems, such as the Great Artesian Basin. Since the quality of water may significantly differ between strata, groundwater currently used for human consumption or agriculture may be contaminated by poorer quality water from adjacent strata. In addition, exposure to air, gas, and chemicals used for drilling and hydraulic fracturing can greatly impact the quality of groundwater. According to the study in the USA, methane contamination was detected in 51 out of 60 (85%) of drinking-water wells [5].

Surface water

12.7 million hectares of the NSW portion of Murray-Darling Basin is already covered by the petroleum exploration licenses [6]. Due to the nature of the hydraulic fracturing process, vast amounts of surface water will be required. This is a severe threat to the Murray-Darling Basin, where water is already drastically over-allocated. If more water is allowed to be removed from the system, all the effort and money spent to

save the Murray-Darling will be wasted, and the impact to agriculture will be significant.

Waste water

During the CSG extraction process, large volumes of "produced water" are drawn up. Produced water is typically saline and may contain not only chemicals used in fracking but also chemicals that have been naturally trapped within the underlying rock formation. Produced water can either be stored in evaporation ponds, treated to be released into waterways, reused, or injected back into the aquifer.

In case of evaporation ponds, on top of the large area required for the construction of ponds, there are significant environment impacts related to the water escaping from the ponds through leaking, flooding and evaporation. Surrounding soil quality and vegetation are both affected by leaking, surface water can be contaminated through flooding, and hazardous volatile/semivolatile chemicals in produced water are transferred into the atmosphere during the evaporation process. Reverse Osmosis filtration is commonly used in produced water treatment prior to the release into waterways, however contaminants which are smaller than water molecules are not filtered out and will be discharged to waterways. These spills of produced water into the environment will considerably affect the quality of both surface and ground water and soil that could lead to the destruction of ecosystems such as extensive tree death in the Pilliga.

Recommendations

- Drilling in the area where groundwater is used for human consumption or agriculture should be prohibited;
- Surface water usage by the CSG industry should be limited, especially in the Murray-Darling Basin;
- The storage of produced water in agricultural areas should be prohibited;
- Discharging produced water into waterways and re-injecting it into underground should be banned; and
- The impacts on soil and water in surrounding area including the result of cumulative loads,

needs to be monitored and assessed.

2. Effects related to the use of chemicals

The Wilderness Society acknowledges the NSW Government's commitment to ban of the use of BTEX compounds in the coal seam gas hydraulic fracturing additives. However we still hold concerns around the environmental and health impacts, due to potential contamination of water used for human consumption and agricultural production by chemicals used in drilling or fracking, as well as those chemicals present in the coal seam.

Fracking chemicals

The effect of chemicals used in hydraulic fracturing on environment and human health is unknown due to the lack of disclosure of chemicals used in the process. Moreover only 2 out of 23 most commonly used chemicals had been assessed by the National Industrial Chemical Notification and Assessment Scheme (NICNAS) [1].

Drilling chemicals

Similarly, drilling chemicals are generally treated as trade secrets and it is difficult to assess their potential adverse effects for the same reason as fracking chemicals [1]. Of major concern is BTEX, which is commonly found in drilling stage of hydraulic fracturing. They are known to be hazardous and may cause number of problems to human health including negative effects on central nervous system, respiratory system, and kidney and liver functions. BTEX are also found naturally in the coal gas seams and the fracking process potentially releases them from gas reservoirs, dispersing them into air and into groundwater aquifers [1].

Recommendations

- All chemicals used in the process should be disclosed; and

- Until acute and chronic effect on environment and human health of each chemical as well as synergetic effects of them, are assessed, use of these chemicals should be banned.

3. Effect on Crown Lands including travelling stock routes and State Forests

The Wilderness Society has particular concerns on the use of Crown Lands for coal seam gas exploration and extraction when they have been reserved for specific environmental conservation purposes. These include land tenures such as State Forests, State Conservation Areas and travelling stock routes, all of which have been identified for conservation management as they include areas of natural significance or a particular type of habitat.

Travelling stock routes (TSR) are supposed to be parcels of Crown lands mainly reserved for the grazing industry, but also for conservation. They provide essential corridors for wildlife migration, especially in areas already degraded from agriculture and industrialisation. The recent pilot study undertaken by the Land and Property Management Authority (LPMA) has identified that the majority of TSRs in the Hunter Valley *"have significant environmental values, particularly in providing habitat for threatened species and many are in over cleared landscapes and adjacent to important waterways*[1]*"*.

State Forests (SF), are reserved for conservation. However, besides having recreational and aesthetic values, they produce timber, protect water catchments, provide habitat for wildlife, act as carbon sinks, and purify water.

Despite the intrinsic value of these Crown Lands and the devastating impact of the CSG industry, TSR and State Forests are already under threat from current and proposed CSG developments. Both our protected areas and public lands are not safe – CSG mining can occur in areas bordering National Parks and is permitted in State Conservation Areas and State Forests.

For Example:

- *The proposed CSG production project by Eastern Star Gas **covers** approximately 85,000 hectares and includes Pilliga East State Forest, Bibblewindi State Forest, Jacks Creek State Forest, and Pilliga East State Conservation Area, plus some areas of Crown Land and private land.*
- *In north-east NSW, a gas **pipeline** is proposed through the World Heritage-listed Border Ranges NP. In north-west, Eastern Star Gas' proposed pipelines have the option of going through farms, using existing infrastructures or renting TSRs. TSR are also targeted for drilling.*
- *At Putty, **drilling** is planned next to the World Heritage-listed Wollemi NP ; at Poggy, drilling is occurring on an inholding in Goulburn River NP ;*

Recommendations

- Protection of natural areas from coal seam gas, including exemption from Crown Lands such as State Conservation areas, State Forests and Travelling Stock Routes.

4. Effects on our natural environment and biodiversity

Coal seam gas exploration and extraction has a significant, and in some cases unknown, environmental impact throughout the process including extensive landclearing, fragmentation of natural areas, introduction of weeds, degradation of threatened species habitat and disturbance of wildlife connectivity corridors. Coal seam gas wells also increase the risk of catastrophic bushfires.

The Wilderness Society is concerned that the expansion of coal seam gas will lead to the industrialisation of NSW's precious natural environment due to the extensive infrastructure that the CSG process: drilling of coreholes, production wells, water treatment infrastructure, water impoundments, access roads and pipelines all of which will cause irreversible damage to the landscape and disturb the native wildlife.

Landclearing

Land clearing (also called deforestation) is the permanent removal of native forests and other bushland. In Australia most land clearing is done to extend grazing and farming land. Clearing of native vegetation leads

to the immediate threat of soil erosion, siltation of rivers and decrease in biodiversity.

"Landclearing is without doubt the greatest threat to biodiversity in Australia"

Professor Ian Lowe, Griffith University QLD

The cumulative impacts of land clearing surrounding coal seam gas wells and infrastructure in NSW is of grave concern to The Wilderness Society. Mining is exempt from the *Native Vegetation Act 2003* under which vegetation on farming land is subject to approval, and will therefore not have to follow the Native Vegetation Regulations 2005 to ensure that it satisfies the 'maintain or improve' test for impact to the environment.

For example: Eastern Star Gas' project is currently threatening the Pilliga forest which is home to endangered species (such as the Pilliga mouse), including 24 species listed under the federal 'Environmental Protection and Biodiversity Conservation Act 1999'.

Weeds

Invasive weeds pose a serious threat to our natural environment. The ecological value of sites where coal seal gas is present faces a direct risk from increased weed invasion, which will displace native species and contributing to further land degradation.

5. Effects on Rivers and Wetlands

Apart from the obvious threat to our ground and surface water systems, the coal seam gas process also poses a big, new threat to our river and wetland systems. The cumulative impacts of potential infrastructure and water extraction across NSW have the potential to cause major disruption and further degradation of our river and wetland systems, even distant ones that are hydrologically connected. The location of CSG wells on sensitive floodplains and in water catchments is of great concern.

The large amount of produced water from the coal seam gas process also poses an unknown risk from increased salinity to an already fragile landscape. It still appears unclear exactly how the industry proposes to deal with the saline water in a manner that will not harm our environment.

In NSW we live in an already stressed and fragmented landscape. Our rivers are the most degraded in Australia, with less than 3% in their natural state. The Wilderness Society fears that the use of large volumes of water and the potential impacts on water quality by the coal seam gas industry will cause irreversible and unacceptable strain on already over-allocated river systems, such as the Murray-Darling Basin.

Murray Darling Basin – the threat from coal seam gas

The Murray-Darling is the largest river system in Australia. It extends over one million square kilometres from Queensland through New South Wales and Victoria to South Australia. It is home to over half of Australia's native fish species, the iconic River Red Gum forests and some 30,000 wetlands, 15 of which are recognised as being of international significance.

The Murray-Darling Basin is also the food bowl of Australia, accounting for 39% of gross agricultural production. More than four million people depend on the Basin for water and it supports a tourism industry worth more than $3.4 billion annually. Traditional Owners of the land have a cultural connection with the river spanning millennia. The Murray- Darling is truly the lifeblood of Australia.

In NSW, there are already 12.7 million hectares of Petroleum Exploration Licences located within the Murray-Darling Basin. The potential threat to the Murray Darling Basin from the industry could expand within a very short timeframe to involve tens of thousands of wells and tens of thousands of kilometres of pipelines.

The issue of salinity has historically been one of the most significant environmental problems facing the Murray-Darling Basin. In an average year two million tonnes of salt travels down the Murray-Darling. In

order to remain healthy, the system must be allocated adequate flows to the environment to be able to flush this salt out to sea. If this does not happen, salt accumulates and poisons land and water resources, making them uninhabitable and unusable.

The Wilderness Society is concerned that the produced water from the expansion of the coal seam gas industry across our landscape will add further salt to a system that is already under immense pressure.

In 2007, in an attempt to comprehensively address the problems of the Murray- Darling, the Australian Government passed the Water Act, established the Murray-Darling Basin Authority, and allocated $10 billion of taxpayer's money to 'buy back' water for the river and build water-saving infrastructure.

In 2010, the Authority released the Guide to the Basin Plan which outlined several scenarios based on the best available peer-reviewed science. The scenario which carried the least risk of irreversible damage to the river would seek to return 7600GL of water to the Murray Darling. The draft Basin Plan is expected to be released in November 2011, with a new plan for the future of the Basin.

The coal seam gas industry, if allowed to proceed, will convert large sections of the Murray-Darling Basin into industrial zones and pose a severe risk to our water resources, our farmlands, our natural assets, our communities and our way of life.

Recommendations

- To protect the riverine processes and the natural values of the river system, development activities that have the potential to cause significant impact must be minimised. The Wilderness Society recommends that the NSW Government follow best practice put forward through The *Wild Rivers Act 2005* in Queensland and declare a buffer zone around the area within and up to one kilometer each side of the wild river, its major tributaries and special off-stream features, such as floodplain

wetlands.

6. Nature and effectiveness of remediation required under the Act

NB: the Act = the NSW Petroleum (Onshore) Act 1991

Coal seam gas exploration and extraction is a destructive process, the remediation of which is not satisfactorily addressed through the NSW Petroleum (Onshore) Act 1991. The low level of remediation required under the Act does not address the large environmental impact, particularly the cumulative impacts across the landscape. This could lead to irreversible damage to our natural systems and waterways when combined with the CSG industry's poor management of remediation, or even its complete failure.

Remediation required under the Act

The Minister for Resources and Energy is currently responsible for addressing proposed environmental impacts under the Act [Part 6, Division 1] before granting a mining title, however the conservation and protection of the environment is broadly defined.

Nevertheless, the following division [Part 6, Division 2] does not make it compulsory for the "*conditions subject to which a petroleum title is granted or renewed*" to include conditions relating to this protection of the environment. Neither compulsory is the inclusion of conditions related to "*(a) the rehabilitation, levelling, regrassing, reforesting, or contouring of any part of the land the subject of the [mining] title that may have been damaged or adversely affected by operations and (b) the filling in or sealing of excavations and drill holes*". The Minister can even "*alter any such conditions*" if considered "*inadequate*".

Therefore, the threats of connivance, laxity, and ineffectiveness of remediation may rise from the requirements set out in the Act itself.

Recommendations

- [Division 2] be reinforced to:

- **to make compulsory the inclusion of the conditions** (relating to the protection and conservation of the environment) in the conditions subject to which a mining title is granted or renewed, and
- to make it compulsory for these first conditions to be directed with the least **environmental** impact possible.

- [Part 6, Division 3] should be reinforced so as **to make systematic the *"directions** to comply with conditions"*. Thus, the holders of mining titles who fail to comply would systematically be subject to the *"100 **penalty** units"* and have a *"**debt** due to the Crown"* if the *"Minister may cause to be taken any of the steps specified in which the direction was given"*.
- [Part 6, Division 4], the non-systematic **clearing away of a mining plant** (when the mining title comes to expiration) may lead to laxity as well, since a promise of sale may fail.
- **Fugitive emissions** spotted in numerous CSG well pads are part of their negative impact on the environment but they are not currently assessed by the Act and remain "un-remediated".

Effectiveness of remediation in New South Wales

The effectiveness of remediation in NSW from coal seam gas exploration and extraction is questionable, even at the exploratory phase. The NSW Government also needs to ensure that there is robust enforcement and compliance with remediation efforts following the CSG process.

Example:

- *At Casino, drill ponds have not been remediated ;*
- *In the Pilliga, there has been no remediation of well-pads which have remained unused for ten years.*

7. Effect on greenhouse gas and other emissions

Coal seam gas is a fossil fuel and a significant source of greenhouse gas pollution. It generates more than 40

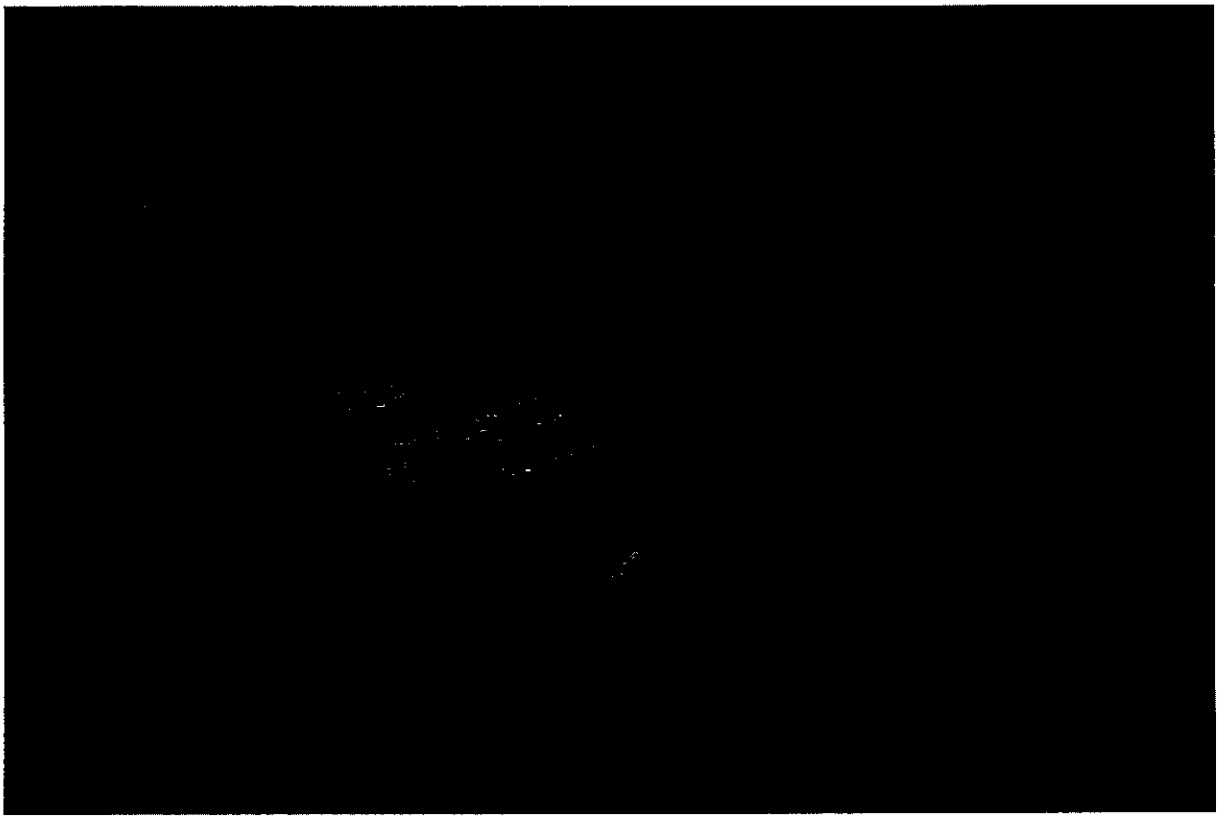
times the amount of greenhouse gas per unit of energy generated than solar or wind. Coal seam gas will make a major contribution to global warming, particularly when fugitive emissions and liquefaction prior to export are fully considered.

8. Inadequate planning controls for coal seam gas developments

The Wilderness Society believes that the current planning process for environmental protection at both a State and Federal level is inadequate. In a first real test case in NSW, environmental damage is already being done in the Pilliga State Forest under a *'pilot production'* license. The issue outlined below is currently under investigation by the Federal Government.

Eastern Star Gas proposal in the Pilliga Forest - Case Study

The Wilderness Society, the Northern Inland Council for the Environment and the Nature Conservation Council released a report in July 2011 which exposed that Eastern Star Gas work on the coal seam gas field in the Pilliga had been causing environmental damage and avoiding environmental laws in the process. A synopsis of the report is below, with a full copy of the report attached in Appendix 1.



The Dewhurst Complex. Photo: T. Pickard

Under the Radar

The Pilliga Forest is home to a host of threatened species, including the Pilliga Mouse and the Regent Honeyeater. Many of these species are listed under the federal *Environmental Protection and Biodiversity Conservation Act.*

When a company wants to develop a project on a site with nationally listed threatened species, they are required by law to refer the project to the federal environment department.

Eastern Star Gas has been exploring for and producing coal seam gas in the Pilliga Forest since 2004. This has resulted, amongst other actions, in the clearing of 150 hectares of forest, fragmentation of a further 1700 hectares, and the dumping of waste water into creeks.

The *Under the Radar* (Appendix 1) report concludes that Eastern Star Gas has impacted threatened species habitat, and should have sought federal environmental assessment for its operations. All current and proposed activities should be suspended, and assessed by the Commonwealth Environment Department.

Eastern Star Gas, after ignoring environmental legislation, now wants to build the biggest coal seam gas project in NSW in the Pilliga. They promote this destructive project as environmentally friendly and well managed.

CONCLUDING RECOMMENDATIONS

Further to the specific recommendations throughout this submission The Wilderness Society is calling for:

1. **A moratorium on all coal seam gas developments until there a robust, transparent and independent assessment of the impacts of groundwater extraction on regional water sources.** There is a significant risk that the extraction of groundwater from regional aquifers will cause serious water table drawdowns locally, as has already been the experience of a number of irrigators in the Queensland. In addition the impact of the extraction on regional groundwater dependent eco-systems is irreversible and the impacts may not be seen for a number of years. Once these assessments have been conducted it is essential that mining activities operate under the same rules as other water users. This includes licensing coal seam gas water extraction and adherence to sustainable groundwater extraction limits of the local and regional aquifers. Water use by coal seam gas companies is currently unlicensed and in excess of the sustainable water use limits as defined in the regional water plans. The approval of water extraction by coal seam gas projects is uncontrolled and poses a high risk to regional water supplies particularly the Great Artesian Basin and Murray Darling Basin.

2. **Appropriate management of coal seam gas wastewater and by-products.** At a minimum coal seam gas water must not be discharged into local waterways and evaporation ponds must not be constructed on environmentally sensitive or high quality agricultural land. There are currently no sustainable methods for disposing of the tonnes of salt, metals and residual chemicals produced from the evaporation of coal seam gas water. This lack of planning for the containment of by-products is a major oversight of the current approval process.

3. **Coal seam gas exploration and mining to be made subject to all relevant environmental legislation, including the native vegetation and water management laws.**

4. **The provision of standing to ensure that the community has full legal rights to challenge and enforce environmental laws under which coal seam gas companies are operating.**

5. **The provision of a right in the Petroleum (Onshore) Act to allow landholders to refuse consent for coal seam gas exploration or production on their land.**

6. **A prohibition on coal seam gas exploration and mining in important bushland, valuable farmland, groundwater aquifers, residential areas and public lands.**

7. **A requirement that all chemicals used in coal seam gas drilling or fracking must be assessed by the chemical regulator for use for that purpose before being approved for use.**

END

Yours sincerely,

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