

Submission
No 255

INQUIRY INTO COAL SEAM GAS

Name: Mr Denis Wilson
Organisation: Australian Water Campaigners
Date received: 6/09/2011

Denis Wilson

5 September 2011

Submission from Denis Wilson
Chairman,
Australian Water Campaigners Inc

For the NSW Legislative Council's General Purpose Standing Committee No. 5:

Coal Seam Gas Inquiry

With the rapid expansion of CSG extraction, I am concerned with the CSG industry push for enthusiastic adoption of this technology in order to produce so called "Clean Energy". CSG is no such thing.

How can people such as the Federal Environment Minister, Martin Ferguson claim that CSG is clean energy source, when even the Industry makes no attempt to quantify the fugitive emissions which come from its operations?

Such claims amount to what is known in the Computer Industry as BIBO – "Bullshit in – Bullshit out". The claim sounds good, but it is meaningless.

However, the unquestioning acceptance of such claims, because they have come from someone as "authoritative" as a Federal Minister, can be used by industry and even by independent bodies such as your own Parliamentary Committee, to cover-up a potentially dangerous fallacy. The great lie of CSG as "Clean Energy" needs to be challenged directly.

I now wish to address the thing dearest to my heart in this issue – the impact upon water resources in Australia.

From my reading it seems that the impacts of CSG extraction on water resources is even more destructive than the well-known problems associated with longwall mining of coal seams.

This submission is largely confined to addressing the issue of impacts of CSG activities on aquifers and river systems. We believe that this issue is the most serious of all, involving the long term sustainability of NSW's water resources.

Nevertheless we would like to mention in passing the importance of recent reports which address related issues, such as the Cornell University study indicating that methane emissions from CSG operations may contribute more greenhouse gas than conventional coal mining; ¹also the Doctors for Environment Australia report which outlines health risks in great detail and from many angles².

1) Overseas Experience in CSG Mining

Fortunately we in Australia have the opportunity of learning from impacts of previous CSG mining on aquifers and rivers overseas.

I understand that overseas experiences will be said to be in different geology (esp Shale Vs Coal Seams). That may be true, but the technology is largely the same, and many of the Industry Experts have learnt their trade in the USA, and the drilling companies use Halliburton products as an industry standard.

So, perhaps there are differences between the overseas experience and Australia, but there are overwhelming similarities.

In the USA thousands of complaints are now lodged with state and federal agencies by people impacted in various ways by CSG mining³. We would not want to see the same expensive upheavals here.

In the Appalachian town of Dimock, for example, the water supply was contaminated by leaky gas wells, causing high levels of iron and aluminium in their aquifer, as well as toxic ethylbenzene.⁴ This resulted in illness in humans and animals. The EPA USA is researching impacts ahead of future federal legislation.

New York State has meanwhile imposed a one year moratorium on fracking (from 6 June 2011).

Officials in Pennsylvania have recently fined a gas company over \$1 million for contaminating the water supply of 16 families.⁵

France banned fracking in May. South Africa has imposed a moratorium in Karoo: a large semi-desert region. A UK study (University of East Anglia) calls for a moratorium.

The new Coalition government of NSW imposed a 60 day moratorium on new coal or CSG exploration licences and is reforming aquifer interference regulations, hopefully taking CSG impacts into account.

¹ R. Howarth, R. Santoro, A. Ingraffea, "*Methane and the Greenhouse Gas Footprint...*" Cornell University, 12/4/11 (www.springerlink.com)

² Doctors for the Environment Australia, *Submission to Senate Inquiry into Coal Seam Gas*, June 2011

³ Debra Jopson & Ben Cubby, SMH, 25/9/10

⁴ Ibid.

⁵ Pro Publica, USA, 17/5/11

We call on the NSW Government to extend this moratorium until the issue is adequately researched and regulated.

Much more research needs to be done before moratoriums and bans can be safely lifted and until such time there is enough alarming evidence concerning aspects of CSG operations for a halt to be called, alongside the growing number of agencies around the world.

2) Sustainability of Aquifers

Rivers are the life blood of every nation. Rivers depend on inflow from aquifers. Australia is the driest continent, with climate change already having an effect, an effect that will result in more severe droughts and higher temperatures. Therefore the protection of Australian river systems is of supreme importance.

Agriculture in NSW is highly dependent on bore water pumped from aquifers and river systems. Our greatest asset, the Great Artesian Basin (straddling the NSW/Qld border) is already sadly depleted and the rapid expansion of CSG wells will hasten the unsustainable rate of extraction here and in all other areas where rivers and ground water are exploited by CSG operations.

Possibly up to 80% of current water volumes being extracted from the Great Artesian Basin is solely for CSG operations.⁶ We support the call for CSG extraction to be banned altogether in the GAB basin and in other major catchments and river systems.

The huge volumes of water used by CSG operations will increasingly compete with human and agricultural needs, and the rapid growth of protest activities by farmers and environmentalists in NSW and Queensland attest to this concern.

Even Ross Dunn, head of the industry body Australian Petroleum Production and Exploration Association, admitted that landholders have legitimate concerns about the industry's effects on groundwater.⁷ At a CSG community meeting in Leichhardt he said that "drilling will, to varying degrees, impact on adjoining aquifers. The extent of impact and whether the impact can be managed is the question."⁸

But the question cannot be answered. The newly established Centre for Groundwater Research and Training reports: "Because existing data is limited or non-existent, management decisions are being made using hydrogeologic conceptual models that can be grossly misleading."⁹

If CSG is allowed to continue at some later stage (we would oppose this at present) the rate of extraction of ground water and river water must be carefully regulated and monitored to ensure sustainability of the state's water resources. This may mean a drastic reduction

⁶ Doctors for the Environment Australia, *op.cit.*, p8

⁷ ABC, AAP 28/4/11

⁸ Leichhardt CSG Meeting, August, 2011

⁹ Doctors for the Environment Australia, *op.cit.*, p. 7

or a staggering of CSG operations but the necessity of protecting water resources must be paramount.

Furthermore, I would point out that the Great Artesian Basin is a natural occurring system of Aquifers, which cross State Boundaries. It has a flow towards the south-west, from Queensland. Consequently, despite the best intentions of your State-based Committee, political decisions and practical (industry-caused) activities can prejudice the outcomes within New South Wales. As a result, I urge your Committee to make its own representations to the appropriate Federal Minister(s) (probably the Minister responsible for Water and the Minister responsible for Agriculture) to express any recommendations your Committee may decide upon. I would point out specifically that Minister Burke has approved up to 40000 CSG bores to be drilled in Queensland. The actions taken in those bores will inevitably affect the GAB in NSW. His Federal-based powers impact on your areas of responsibility, but he did not consult you, or any other NSW State Authorities. I refer to the suite of approvals given by Minister Burke on 22.10.10, including, but not limited to his 50 year approval for Santos and Queensland Gas Corporation to drill between Roma and Emerald. Here is the link to the Minister's Press Release. [EPBC Approvals - Queensland Gas Corporation - Santos - Queensland coal seam gas projects](#)

3) The extraction process

One major problem concerns the initial process of extraction: drilling and then cementing the wells.

As wells are drilled, the drill will probably breach one or more aquifers before reaching the coal seam. The drill wells are then cased in a thin cement layer (cement plus water plus calcium carbonate). A lot can go wrong in the process of cementing a gas well. Faulty equipment, a botched mix, a failure to fill even a tiny crevice with cement, a minor – or major – earth tremor can all produce dire consequences (and of course added to this is the question of just how long cement casing will last before crumbling and collapsing).

The inevitable errors will cause saline water and toxic chemicals, oil and other wastes from the subject well to leak and to contaminate aquifers as at Dimock. And as at Tara in Queensland, where 5 wells were emitting flammable levels of methane gas. According to farmer Tim O'Connor, a gas well has blown out no less than four times on his land near Dalby, Qld.¹⁰

The BP oil rig disaster in the Gulf of Mexico of April 2010 was, according to a National Commission report, the result of a faulty cement job: "cementing failures are not uncommon even in the best of circumstances."

We submit that we must not gamble with this process near our major river systems. Are all wells being carefully monitored? Is an adequate risk assessment in place? Are there suitable emergency procedures and rehabilitation methods in place? We believe that in the rush to develop this commodity the survival and the safety of water resources is under threat.

¹⁰ ABC News, 24/5/11

For instance, the recent gush of water from AGL's Rosalind Park well demonstrated that the company was unable to cap this powerful jet of contaminated water. Emergency procedures were either absent or totally inadequate.

AGL maintains that the foam observed on video in this accident was merely detergent, but we have not heard of any independent confirmation of this. We note that the "foam" was blown towards the open waters of the Upper Canal, only 200m away. The Upper Canal carries on average 20% of Sydney's water supply to the Prospect Reservoir. This vital flow of water is thus at risk of uncontrollable contamination .

AGL apologise for this slip-up, but I maintain that a responsible government would make sure that all CSG operations must be kept at a safe distance from water supplies: dams, canals, reservoirs, catchments and river systems. AGL and other gas companies can only operate in such dangerous circumstances when approved by the NSW Government.

I am appalled that CSG extraction might even be approved in the Warragamba catchment (the Warragamba Dam supplies 80% of Sydney's water) and in the Woronora Dam catchment (supplying Sutherland Shire and northern Illawarra).

As the Doctors for the Environment submission says: "The monitoring of potential contamination of water supplies in coal seam gas mining areas is inadequate ...Human health relies on having clean safe drinking water ... CSG operations should not be allowed to endanger these basic health needs of Australians."¹¹

Furthermore, the NSW government should have no confidence in the ability of the gas companies to manage environmental damage and risks adequately. The companies are proving inadequate to cope with emergencies and even with "normal" operational procedures.

There have been numerous accidents and leaks. The Queensland government, for example, tested 58 wells around Tara and found that 26 of them leaked, some seriously.¹² Testing only took place after media attention and community protests, not because a rigorous and responsible testing procedure was in place, as it should be everywhere.

Mining magnate Clive Palmer, not known as an environmentalist, has reported that a leading Chinese company told him that the CSG extraction techniques used here were abandoned in China twenty years ago. Palmer concluded: "CSG technology currently used in Australia is lethal and will kill Australians, poison our water table and destroy the land."¹³

I would add the comment that, in my experience in the Southern Highlands, the people being hired to do the CSG drilling are primarily water bore drillers. They may have the necessary equipment to drill the bores, but they have no experience in sealing bores to the levels expected

¹¹ *DEA Submission*, pp 3, 10

¹² *Ibid.*, pp 23-24

¹³ Clive Palmer, *ABC News*, 28/8/10

in the Oil and Gas industry. It is precisely this problem which has led to the numerous reports of leaking gas wells in Queensland and in the Pilliga Forest in NW NSW..

4) **Unsustainable Water Usage in CSG Operations**

Huge amounts of water are necessary in the CSG process, and this usage as it expands will compete with human and agricultural needs, as well as the need for rivers and creeks to be fed by groundwater sources into the future. The user – the CSG company – gets the benefit but the rest of the population and the environment bear the cost.

A related example is the use of 30,000,000 litres of water per day taken from the Great Artesian Basin by the Olympic Dam, at an absurdly low cost to the company.

And while the Great Artesian Basin management plan (GABSI) is trying to reduce outflow by 200,000 ML p.a. to manage it sustainably, Queensland Gas Company plans to drill around 6000 gas wells in the Surat and Bowen areas of the GAB. A J.P. Morgan Report, 2010, estimated that in the Surat and Bowen basins between 125 – 350 gigalitres p.a. will be extracted.

CSG operations in the Powder River Basin in Wyoming have caused drops of up to 200m in near-surface aquifers.¹⁴ Australian farmers are facing similar disasters in CSG regions.

The high water usage is unsustainable. Recharge processes in aquifers are slow and aquifers are already seriously depleted through use of agricultural bores and pumps, through coal mine usage and now through rapidly expanding CSG mining.

As groundwater is extracted pressures in adjoining aquifers, underlying or overlying the coal seam, may fall and flows to rivers and streams and bores will be choked off. This can only result in the further degradation of our river systems.

As drilling breaches more than one aquifer, water from one may contaminate water in another. Dr John Williams, formerly of CSIRO, from the Wentworth Group of Scientists and now head of the Natural Resources Commission, recommended in a 2002 catchment audit that mining plans “should be approved only if they can reasonably demonstrate that subsequent subsidence is unlikely to affect water courses or hanging swamps.”¹⁵ Now he is equally concerned over CSG extraction: “It’s likely to be breaking some of the barriers between good and bad water and putting the good water at risk.”¹⁶

5) **Dangerous Disposal of Waste Water produced in CSG process**

¹⁴ *Coalbed Natural Gas Regional Groundwater Monitoring Project*, Powder River Basin, 1993 - 2006

¹⁵ *Audit of Sydney Catchment*, November, 2002

¹⁶ *Coal Seam Gas News*, 27/6/11

The coal seam water which spurts up from the wells, as the coal seams are depressurised, is unfit for human consumption or even for agriculture. It may contain radioactive substances as well as salt and other toxic chemicals. There is a huge problem with its disposal. Often water is kept in large dams on site, where there is the risk of overflow in heavy rains, or the risk of seepage into the groundwater if the disposal dams are not lined. And if lined, how long will the lining last ?

Waste water can be injected into underground storage pits, but this ensures seepage into adjacent groundwater unless adequately and permanently lined. Even worse, the waste water is sometimes discharged into nearby surface water. Sometimes it is transported to treatment facilities of questionable effectiveness.

Some operations have been using the contaminated water to spray on to their access roads to suppress dust, but residents at Tara in Queensland complained of illnesses caused by this spray.¹⁷

And will the dams be adequately monitored for decades ? A Pennsylvanian Oil and Gas Association official has estimated that “the waste that flows back slowly and continuously over the 20 – 30 year life of each gas well could produce 27 tons of salt per year.”¹⁸

As thousands more gas wells are approved, the impacts of the aggregation of salts over the coming decades could be disastrous unless treated or transported off site – but where to ? Even if to the ocean, this is not without problems.

6) Fracking Chemicals

Although the Vice President of the Queensland Gas Company recently stated that fracking chemicals are “benign everyday ingredients” we submit that he can only assert this because there is a lack of precise information. As the Doctors for the Environment submission to the recent Senate committee inquiry argues, only 2 of the 23 commonly used chemicals have been assessed by our National Industrial Chemical Notification and Assessment Scheme (NICNAS), yet there are already examples in the USA and in Australia where harmful chemicals have been found in groundwater subsequent to CSG exploration and mining.

Dr Mariann Lloyd-Smith, an adviser to NICNAS, told the ABC recently that they have concerns over contamination and loss of pressure on groundwater bores, and the nature and use of the chemicals involved.¹⁹

Many other scientists are increasingly concerned over water being poisoned by fracking.²⁰

The commonly used BTEX chemicals are banned in many places, as we have noted. The fracking process may contaminate water with salinity, with gases or with BTEX where leakage

¹⁷ *The Courier Mail*, 21/10/10

¹⁸ *New York Times*, 27/2/11

¹⁹ *ABC* 28/4/11

²⁰ *Ibid.*

occurs. Where fracking procedures intercept fissures or faults underground the bore casings may split. Toxic fracking fluids may contaminate water and move into other geological layers. The risks of accidents is magnified with the huge number of gas wells being installed.

Last year, for example, a company discovered traces of cancer-causing BTEX chemicals at eight drilling sites near Miles in Queensland.²¹ Arrow Energy has been trying to discover the source of benzene detected at its Mooranbah Gas Project.²² Tara residents have noted that a local creek is polluted with a brown oily substance, not yet analysed but causing understandable concern.²³

Given growing community outrage, some gas companies now promise that they will not frack. However fracking chemicals are not the only problem. The fracturing of rock by drilling also releases a number of toxins which leach into the water. Professor David Shearman, professor of medicine at the University of Adelaide, is concerned not only with fracking chemicals “but also with those arising in coal seams themselves which may be brought to the surface. This flow-back water can contain volatile organic compounds, high concentrations of ions such as calcium, iron, magnesium, sodium, strontium and also radioactive substances. Potential long-term hazards are cancers and deformities.”²⁴

7) **Moratorium until Adequate Research is Completed**

Every serious student of the CSG expansion calls for more research. We repeat the statement from the National Centre for Groundwater Research and Training: water planning “requires far more knowledge of sub-surface water systems than is currently available ... decisions are being made using hydrogeologic conceptual models that can be grossly misleading.” Precise impacts of CSG mining are unclear and the National Water Commission has also emphasised the urgent need for further research.

After a moratorium of at least two years, and independent and thorough research, we would want to see site-specific research carried out in each case before exploration licences are approved , and we would also want to see many more officials of local and national agencies employed to monitor all gas wells, and be empowered to impose hefty fines and demand serious rehabilitation efforts where breaches occur. Ability of the companies to respond to emergencies must also be monitored and regulated properly.

CSG should never be allowed in the GAB or in drinking water catchments.

²¹ *The Courier Mail*, 21/10/10

²² *ABC Rural News*, 9/11/10

²³ *The Courier Mail*, op.cit.

²⁴ *Coal Seam Gas News*, 27/6/11. Professor Shearman was speaking on the submission by Doctors for the Environment Australia to the recent Senate Inquiry

Finally, we support the call for a review of all water legislation to better ensure protection of surface and groundwater. Current regulations and legislation in NSW is obviously not adequate to protect drinking water sources from depletion and contamination.

Thanks for the opportunity to comment on this inquiry.

Name: Denis Wilson