Revised Revised Submission for Review of Coal Seam Gas Activities in NSW

Sam Iyer to: csg.review 26/04/2013 12:01 PM

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Dear Professor Mary O'Kane,

Thank you for allowing me to make a submission to your Coal Seam Gas Activities in NSW Review.

PREAMBLE:
I have been a general practitioner in the Inner West of Sydney from 1978 and have dealt with patients real and percieved illnesses for over 35 years. in the context of the current debate on the toxic effects of coal seam gas, I have found in my experience that patients react adversely to new ideas if they are repetitively fed constant untruths about the ill effects that these new ideas can bring about. These untruths could be fed unknowingly or knowingly to serve an agenda, but whatever the reason, theycause fear and anxiety in the minds of the wrongly informed public and this results in the ultimate rejection of the new idea.

A very clear example of this fear in play is acting itself out in the United Kindom at this very moment. Thousands of parents swallowed the repeated untruths fed to them through bad press reporting that measles vaccination could lead to autism and such like and this has resulted in over one million children in the United Kingdom not having the MMR vaccine. Britain now has a severe measles epidemic and is urgently trying to get these unvaccinated children vaccinated and protected against this killer disease. Parents who were misinformed previously are now rushing to get their children vaccinated. The most vulnerable group is the 10 to 18 year old group.

I take the liberty of posting you a couple of relevant links regarding this current epidemic in the UK

http://www.bbc.co.uk/news/health-22290562

http://www.dailymail.co.uk/health/article-2309999/Wales-measles-outbreak-New-case-hours.html

I note that exactly the same type of misinformation process is now being instituted by certain news groups and political parties for reasons best understood by themselves against coal seam gas and fraccing. Environmental reporters in the Fairfax Press have been unremitting in their condemnation of coal seam gas, as have been the ABC, SBS, Mr Alan Jones and the Greens. There are some issues relating to health and the environment that may or may not be due to coal seam gas production. The above news media outlets and Green politicians have decided to present these conjectures as proven fact and have, by a process of sensational and repetitive reporting, managed to plant an unjustified fear and resentment in the minds of otherwise rational people.

It is most unfortunate that coal seam gas has been turned into a political football and consequently power supply in NSW has been critically compromised by politicians who have,

as usual, put their own welfare jobs and re-election hopes ahead of the security and welfare of Austraia. The Liberals, Labor and the Greens have all thrown their comments loosely and shamelessly around in their quest for some electoral returns, disregarding the damage that they have inflicted to NSW and Australia in the process.

IMPACT ON COAL SEAM GAS MINING ON HUMAN HEALTH

There have been various claims that coal seam gas mining causes headaches, nose bleeds, skin rashes and other vague medical problems. Sydney Gas has been running coal seam gas operations in the Camden area for many many years. I have spoken (in confidence) to GP friends of mine who work around the Camden area and have inquired of them if they have generally noticed any increase in these presenting complaints after the recent Sydney Morning Herald reports and the Four Corners and Dateline TV programs. In general, it appears that there have been more people worried about the ill effects to their health after the recent spate of one sided "investigative journalism". This would be a normal human response and is to be expected.

I have spent some time in my own practice asking patients who came in for unrelated illnesses such as hypertension and obesity what their views were on coal seam gas and fraccing. Dart Energy had opened up a can of worms by suddenly stating that they were going to explore for coal seam gas in the middle of inner city St Peters, without proper consultative processes and they gave vital fuel to the Greens, who are hoping to make inroads into the Inner West of Sydney.

The overall response that I got from patients was that coal seam gas and fraccing were bad. In general, the response was that all fraccing involved BTEX chemicals, that there were going to be earthquakes under their houses with land subsidence and property damage and that fugitive methane emissions were going to poison them. Some even stated that they were having nose bleeds, headaches and general ill health issues due to coal seam gas under their houses, and this is even before any coal seam work has started in St Peters.

My patients had obtained their information from the press, the Greens, Alan Jones and the Gasland movie. Such is the effect of an unremitting fear campaign upon the minds of people. I tried to explain to the patients that the currently used fraccing fluids in Australia consisted of water, fine sands or glass beads and some lubricants along the lines of dish washing fluid, and that they were being exposed to BTEX at their local petrol station and in traffic and that a lot of the so called investigative reporting was one sided and had a political agenda. I also tried to educate them that NSW was facing a critical power supply shortage that could and would flow on to industry, employment and hospitals. Finally I have explained to them that fearful thoughts could translate into somatic symptoms at times.

Some patients have seen the light, others stay in frightened denial.

My perception of the minimal health risks of coal seam gas appears to be borne out by the results and conclusions of the Queensland Health "Coal Seam Gas in the Tara Region Summary risk assessment of health complaints and environmental monitering data" report that was just released in March 2013. The conclusion of Queensland Health in the report was:

"Based on the clinical and environmental monitoring data available for this summary risk assessment, a clear

link can not be drawn between the health complaints by some residents in the Tara region and impacts of the local CSG industry on air, water or soil within the community. The available evidence does not support the concern among some residents that excessive exposure to emissions from the CSG activities is the cause of the symptoms they have reported.

"The air monitoring provided to the Department of Health was sufficient to assess whether the reported symptoms were related to CSG activities. However, the available data were insufficient to properly characterise any cumulative impacts on air quality in the region, particularly given the anticipated growth of the industry. It is necessary to assess those impacts according to health-based standards which are relevant to long-term exposure.

"Noise and vibration from CSG activities were common complaints. The DEHP report on its community noise investigation at one site showed that low frequency noise did not exceed the relevant environmental authority. However, there was acknowledgement that the levels could be a source of annoyance. A potential consequence in some people of noise annoyance can be headache, which was the most reported symptom. Conversely, noise annoyance would not explain other commonly reported symptoms such as eye, nose and throat irritation, nosebleeds or skin rashes. If concerns continue in the community about low frequency noise, additional assessment by DEHP and/or industry stakeholders may be required to determine if noise mitigation measures are required.

"Whilst no emissions from the CSG activities are apparent that can explain the reported symptoms, the DDPHU report identified the issue of solastalgia. This term describes the distress that is produced in people by environmental change in their home environment. Negative effects can be exacerbated by a sense of lack of control over the unfolding change process in a person's normal environment (Albrecht, Sartore, Connor et al, 2007)."

It would therefore appear that health issues relating to coal seam gas do exist, albeit at a psychological level rather than anything somatic, and the antidote for this would have to be an unbiased and factual education campaign carried out at a State, and if need be, at a National level to allay unfounded fears and misapprehensions.

IMPACT OF COAL SEAM GAS MINING ON THE ENVIRONMENT

There has been no conclusive evidence that CSG mining contaminates gound water, causes earthquakes or poisons crops. However untruths, if repeated enough times, tend to make even sensible people uncertain of that which they know to be fact.

So it is with CSG.

The facts are that the world is being poisoned by coal and wood burning. I have jrecently seen an article on BBC TV on how 80% of home cooking in Sri Lanka is done with firewood and how this is causing long term problems due to inhaled wood toxins and carcinogens. The reporter stated that Sri Lanka was desperately short of gas, which would alleviate this problem.

You yourself would have seen films of the smog in Chinese cities due to coal burning generators and wood fires. I fear for the health of this and future generations of Chinese, especially the children. This is an all pervasive problem in Asia, from Indonesia to China to India and on to Nepal.

Australians appears impervious to facts such as this because it is not affecting us, but we have to be aware that what happens somewhere else can and will ultimately impact on all of us here. There is no place for any responsible Australian Government to adopt a head in the sand NIMBY attitude to the needs of the rest of the world. The rest of the world (and Australia) needs cheap clean power to serve the world's ever growing population.

Solar power has its problems. Various reports state that a lot of toxic byproducts are generated when the panels are made (in China). Furthermore, the panels have a life span of about 20 years. Then the problem of disposal of the used panels is going to soon arise.

The biggest Chinese manufacturer of solar panels is in deep financial trouble because they have been undercutting the market nd selling blow cost. I believe that other Chinese solar manufacturers are in the same boat. So solar panels are not the cheap and safe alternative to gas that the Greenies are touting.

The Americans are pushing on with gas exploration and production, over-riding their vocal minority. They are soon going to become a nett gas exporter, a change from being so energy dependent just 3 short years ago. This has only occurred because American politicians have taken a hard nosed pragmatic decision to put the United State's ahead of any petty local politics and do what is best for the country. They have advanced and promoted

gas production in the United States and ensured that the national security of the USA is not compromised..
In the UK, Chancellor George Osbourne has gone so far as to positively advocate for fracking by introducing tax breaks for fracking in the 2013 budget. He has overridden the very vocal minority and says that he has to think of the country's security and needs first and foremost, and that Britain needs gas to progress and to be competitive. Reports that fracking can cause earthquake problems have been investigated and found lacking. The Greens and environmentalists in Britain are upset, but that is about all the reaction. Britain accepts that power security is essential for national security.

Perceived environmental issues with coal seam gas exploration and fraccing have been well addressed in a draft report released in April 2012 by Professor Val Pincewski (Foundation Professor and Head of School of Petroleum Engineering, University of New South Wales), Professor Peter Cook (Cooperative Research Centre for Greenhouse Gas Technologies and University of Melbourne) and Doctor Rob Jeffrey (who leads CSIRO's research into hydraulic fracturing).

http://www.chiefscientist.nsw.gov.au/__data/assets/pdf_file/0003/26634/Draft-Letter-from-CSE-to-Min-Hartcher-re-likelihood-of-hydraulic-fracturing.pdf

The report states that fraccing is more likely in the Gunnadeh Basins and Bowen Basin than in the Clarence Morton Basin, due to the coal seam structure and age.

I have taken the liberty of quoting below extensively from the report ito highlight matters that I feel should be considered in this current review -

FUGITIVE EMISSIONS
The fears of fugitive emissions caused by fracking have been addressed by Dr Jeffrey when he states that "hydraulic fractures that are initiated in the coal will then tend to be contained to the coal because the higher stress rock layers above and below the coal act to limit the fracture growth into these rock and are often high enough so that if the hydraulic fracture does not grow into them it will reorient to become horizontal"

AQUIFER INTEGRITY
The concerns of aquifer integrity were covered by Professor Cook when he stated that "Prior to the commencement of production a plan will be drawn up for fraccing which have required amongst other things seismic and micro seismic surveys to determine the likelihood that the coals can be safely and preferentially fractured laterally in the right direction and that there will be no vertical propagation of fractures into underlying or overlying intervals that could be detrimental to aquifers or to CSG production"
"Fraccing will be used in coal seams where the fracture systems can confidently be generated for a distance for the vertical drill hole and where there is a high probability that fracturing will be limited to the coal seam and not propagate into other adjacent rocks"
"Most well designed coal seam gas production wells will have little or no significant impact on groundwater pro vided best practice is followed"

FRACCING
1. "It is also expected that most of the fraccing will occur in the later stages of field developments after the high permeability "sweet spots or "production fairways have been drilled (5 - 10 years)" (Professor Pinczewski)
2. Professor Val Pinczewski reported "that horizontal wells and new technologies based on horizontal drilling which will emerge in this time frame (-10 years) will, to a significant extent,reduce the need for hydraulic fraccing in the future."
3. Professor Val Pinczewski reported that "in NSW we can expect significantly fewer than 30% of CSG wells will be fractured using todays fraccing technologies".
4. "Australia currently has about 5,000 operating CSG wells. Fewer than 5% of these wells have been fracced" (Professor Pinczewski)
5. "There are very important differences between shales and CSG with the key difference being the need for fraccing. The vast majority, if not all, shale gas wells require some form of fraccing to produce commercially. In contrast, only a small fraction of CSG wells require fracture treatment to produce commercially." (Professor Cook)
6. CSG well completion technology is a rapidly developing area with new methods, particularly for Tight seams, being developed rapidly. An example of this is Microhole technology where a number of small diameter radials can be rapidly drilled out of a vertical well with more than 3 radials per seam in a multi-seam

accumulation eliminating the need to fracture. The overall experience suggests that a combination of horizontal wells (single and multi-lateral) together with emergingnew technologies will increasingly reduce the need for current fracking technologyin the future. (Professor Pinczewski)
I believe that horizontal wells and new technologies based on horizontal drilling which will emerge in this time-frame will to a significant extent reduce the need for hydraulic fracking in the future. This is particularly true for NSW where on current indications average seam permeabilities appear to be lower than those in Queensland and where horizontal drilling technologies will therefore have a greater impact on field development. I therefore believe that in NSW we can expect that significantly fewer than 30% of CSG wells will be fractured using todays fracking technologies. (Professor Pinczewski)

Current Practice for CSG Stimulation
Hydraulic fracture stimulation of CSG wells in Australia is done using several treatmentdesigns. The fluids used range from water that has been treated to remove bacteria to gelled fluids that are water based with additives used to increase the fluid viscosity. The most common treatments would be slick water fracs with sand proppant and hybrid fracs that startwith slick water and use crosslinked gel in the last part of the treatment in order to place more sand proppant in the fracture. Slick water consists of water, a bactericide, and an additive to reduce fluid friction while pumping. Occasionally, a treatment is carried out using a foam fluid in order to minimise the exposure of a water sensitive coal to water. (Dr Rob Jeffrey)

In addition to its use in stimulating gas and oil wells, hydraulic fracturing is used to stimulate water wells. Hydraulic fracturing is also used to weaken rock in coal and metal mining operations (van As and Jeffrey, 2000; Mills et al., 2000). This type of work is usually done before mining by preconditioning the rock so that it will fail uniformly when mining occurs. Fracturing for preconditioning is being used in NSW at several mines. Preconditioning involves pumping small volumes (up to 20,000 litres) to create fractures in the rock. Small hydraulic fractures are used to measure in situ stress and this technology, which involves injecting 10 to 100 litres of water, has been used for more than 40 years across Australia (Enever et al., 2000). (Dr Rob Jeffrey)

Hydraulic fracturing can be and is used by companies of different size. The fracture stimulation is almost always carried out by a service company and the cost of the service would be similar for the same type of treatment, regardless of the size of the company. The service company can offer to design the treatment and to carry it out, so company in-house design expertise is not necessarily needed. Larger companies may be able to negotiate a lower stimulation cost by offering a larger number of wells for stimulation at one time. But such considerations are unlikely to be the deciding issue dictating whether a well is stimulated or not. The cost associated with fracture stimulations are typically reduced as more wells apply the technology and service companies compete with one another for work. (Dr Rob Jeffrey)

POTENTIAL APPLICATION OF FRACCING TO COAL SEAM GAS PRODUCTION IN NSW

Whilst there may be a high degree of local variability, in the future it is more likely that fraccing will be used in the Sydney and Gunnedah Basins (where the Permian coals are relatively impermeable) to stimulate CSG production, and less likely that it will be used in the Surat and Clarence-Moreton Basins (where the Jurassic coals are quite permeable. (Professor Peter Cook)

The application of fraccing technology to CSG (and shale gas overseas) has been very successful from an economic perspective, but it has also received significant adverse publicity in recent times, with questions being raised about the possibility of aquifer contamination, groundwater drawdown and the potential triggering of earthquakes. Fraccing has been banned or at times placed under a moratorium, in some countries. However the

technology is increasingly being applied in order to optimise gas production and is of commercial importance. There is a need to ensure that the public is adequately informed about the benefits and potential problems of fraccing and ensure that valid concerns are addressed. (Professor Peter Cook)

Fraccing is less likely to be deployed where the coals are low rank (immature), are soft and relatively plastic (thereby inhibiting the effectiveness of the fraccing process), have a naturally high permeability (so that they will flow gas without the need for stimulation), are cut by ancient fluvial channels (into which fraccing could extend), an unfavourable regional stress field (which might result in the fractures propagating in an unfavourable direction and proximal major aquifers). Younger Jurassic coals in the NSW sections of the Clarence-Moreton Basin and in the southern extension of the Surat basin, have a number of these features are therefore fraccing is less likely to be widely used in these younger basins. (Professor Peter Cook)

Do practices relating to fraccing vary between companies?

The fraccing process is largely undertaken by specialist service companies and consequently there is no inherent reason why a minor CSG company should necessarily adopt lower standard s for the operation than a major CSG company. A larger company is perhaps likely to be more concerned about reputational damage arising from poor practices by a contractor, than might be the case for a smaller company. Differences in procedures exist between the fraccing service companies, with some having a preference for one technique over another, or a preferred fracture stimulation fluid. All service companies are expected to undertake their operations to API standards with some major companies also applying their own additional standards. Some of the examples of CSG practices and consequences offered by for example in the film “Gaslands” illustrate potential problems that can arise, though it is important to point out that the examples used are probably extreme examples that do not represent the "norm" for CSG operations in the USA or anywhere else. Can things go wrong in a CSG operation? The answer is of course yes but the risks are well understood and managing them is a standard part of procedures. (Professor Peter Cook)

What are the fraccing requirements in the life of a CSG project?
A CSG exploration program is undertaken to identify the so called „sweet spots within a basin, where the coals are gassy, the geological structures are favourable and where drilling is most likely to result in a commercial find. Once a suitable prospect has been identified, a well will be drilled, then cased and any aquifer cemented off. If the coal is permeable, then a lateral horizontal well may be drilled to facilitate production. If on the other hand there is insufficient natural permeability then the coals may need fraccing to create permeability and optimise CSG production. Seismic and microseismic surveys may be undertaken to determine the likelihood that the coals can be safely and preferentially fractured and that there will be no vertical propagation of fractures into underlying or overlying intervals that could bedetrimental to aquifers or to CSG production. (Professor Peter Cook)

Can fraccing impact on groundwater resources?

Most well designed CSG production wells will have little or no significant impact on groundwater, provided best practice is followed. Nonetheless fraccing can have significant unintended impacts on groundwaters through contamination by chemicals used in the

fraccing fluid if the original fraccing fluid is not adequately back-produced at the start of production and/or leaks into an overlying or underlying aquifer through vertical induced fractures or unrecognised faults. In addition coals are depressurized by the extraction of water from the seam as part of the CSG production process; if fracturing extends out of the coal into an aquifer, then dewatering of the coal may result in drawdown of the water table. Methane can also leak into an aquifer. In some instances this can arise from natural leakage and there are a number of instances of this in Australia. It can also happen as a result of incorrect fraccing or from leakage of methane from wells. In confined spaces this can resultin asphyxiation or explosion and therefore steps are taken to minimise the risk of this happening. In the USA there is a requirement to carry out remedial action if the concentration of methane in the groundwater is in excess of 28mgm/L (a limit set by the US Department of Interior). In the Gunnedah Basin and some parts of the southern Sydney Basin high concentrations of carbon dioxide can be encountered in some coal scenes, which might result in some acidification of groundwater if there were to be any significant leakage into aquifers. (Professor Peter Cook)

What are the chemicals in the fraccing fluid?

A wide range of chemicals are used in fraccing fluids, with the decision on which to use depending on the composition of the groundwaters , the nature of the fracturing to be developed, the structure of the coals and the preference of the service provider. The definitivestudy of fraccing fluids was released in 2011 by the US Congress. It reported that "14 oil and gas service companies used more than 2500 hydraulic fracturing products containing 750 chemicals and other components....More than 650 of those products contained chemicals that are known or possible human carcinogens regulated under the Safe Water Drinking Act listed as hazardous air pollutants". Appendix A lists the 650 chemicals used many of them carcinogenic. Whilst this sounds alarming, in fact most of them are rarely used or are in such dilute quantities that they do not constitute a significant hazard. (Professor Peter Cook)

An important point to make about fluid composition is that the US Congress report is concerned with fraccing for shale gas; compositions of CSG–related fraccing fluids are likely to differ quite significantly from those used in shale gas. Origin reports that its fraccing fluid for CSG production is typically composed of 97.4% water and 2.6% additives (see Table 2).

Table 2. Composition of fraccing fluid additives (reported by Origin, 2012)

Water 86 - 97%
Quartz sand 2 - 13%
Sodium hypochlorite 0.01 - 0.02%
Sodium hydroxide 0.002 - 0.1%
Acetic acid 0 - 0.1%
Potassium chloride 0.75 - 1.3%
Calcium chloride 0 - 0.0002%
MEA borate 0 - 0.1%
Guar Gum 0 -0.2%
Sodium chloride 0 - 0.004%
Enzyme 0 -0.0002%Sodium thiosulphate 0 - 0.04%

Obviously some components of fraccing fluids can have an adverse impact if present in aquifers in high concentrations, but for the most part there is likely to be sufficient dilution within the aquifer that concentrations will not ex ceed legal limit. In addition service providers are working to use smaller quantities of additives and develop more benign additives. Nonetheless fraccing fluid composition and the possibility of leakage into aquifers clearly is a sensitive issue, particul arly where people and communities are dependent on

groundwaters. (Professor Peter Cook)

THE IMPACT OF GASLANDS ON HEALTH

Gaslands was an emotive movie that went out of its way to paint coal seam gas mining in the worst possible light. It was sensationalism at its very worst, and it did extreme damage in its totally biased presentation. But it sold seats at the movies and it gets shown repetitively by TV Channels such as SBS and ABC, so it made the producers a lot of money. A counter film, Truthland, has not been afforded such publicity by either ABC or SBS.

This has unfortunately instilled worry and distress in the minds of a lot of people and has led to irrational demonstrations. That these people should be so worried and emotional is a cause of concern, but this is not due to coal seam gas but rather due to the mistruths that have been aired so publicly. A more neutral and unbiased press coverage and reporting will go a long way to mitigating these problems.

THE 2 KM EXCLUSION ZONE THAT THE NSW GOVERNMENT HAS SET IN PLACE

1. From the above reports, it can be seen that the 2km exclusion zone that the NSW Government has placed is an over reaction to a vocal minotity and is detrimental to the proper development of gas supplies for NSW. On the other hand, as a General Practitioner, I can understand the unfounded fear andd anxiety that has been generated in the public's mind by the so called "health risks and risk of subsidance of their dwellings.".

2. I submit that this 2 km exclusion zone around residential zones be reduced to 500 metres and that the NSW Government activate an unbiased unemotional educational and news program to educate and inform the public, so that they may be able to understand what coal seam gas is all about and its associated benefits and risks.

3. I submit that horizontal drilling under residential zones be allowed, provided that the horizontal drilling is done at a depth of at least 500 metres from the surface under stringent and strictly monitered conditions.

Thank you
Yours sincerely
Dr Sam Iyer