

***Submission (22 July 2011) to the Parliament of Australia
Senate Inquiry into management of the Murray Darling Basin –
impact of mining Coal Seam Gas***

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Abstract This submission specifically addresses problems with coal seam gas (CSG) extraction. It concludes that there should be no further expansion of CSG extraction because:

CSG extraction is not sustainable. CSG is a finite, not a renewable resource;

CSG extraction has a greater global warming footprint than coal - its increasing exploitation at this stage of the global warming sequence is likely to be disastrous;

CSG extraction has been demonstrated to produce immediate contamination of ground water;

CSG extraction will leave behind a massive, widespread, **ongoing** pollution of groundwater from residual fractured coal deposits with attendant human health problems.

CSG extraction is not sustainable

I am concerned about the implication in some circles (eg., the terms of reference of the NSW inquiry into CSG extraction) that CSG mining is “sustainable”. The Permian coal seams targeted for extraction were laid down some 250 million years ago. They are a finite resource and will not be replenished within the life-time of the human race. To describe their exploitation as “sustainable” is a nonsense. Yet the corporations exploiting them are going at it “as if there is no tomorrow”. Why? If such activity continues there will be no tomorrow, for massive CSG extraction **in particular**, at this phase of the global warming sequence, is likely to exacerbate the warming process **far more than use of coal**.

Scientific evidence that CSG's global warming footprint is greater than that of coal

Coal seam gas is currently touted as a useful “bridging fuel” being (allegedly) much cleaner than coal with a “significantly lower carbon foot-print” etc. For example, Federal Minister Mr Ferguson, (at a signing ceremony for Australia's largest coal-seam gas deal between *Origin Energy*, *Conoco-Phillips* and *Sinopec* - **whereby 4.3 million tonnes of liquid natural gas derived from CSG will be exported to China every year for 20 years**) said “**gas was less emissions-intensive than coal**” while *Origin Energy's* chief executive said, “**gas was far more environmentally friendly than coal**” (*The Australian* April 23, 2011).

Such views seem no longer tenable. The attached peer-reviewed, scientific paper by Howarth *et al.* (2011) conclusively demonstrates that CSG extraction is actually worse than coal, by virtue of the massive leakages of methane during its extraction, production, processing and transport, and by virtue of the fact that, “*Methane is a powerful greenhouse gas, with a global warming potential... far greater than that of carbon dioxide, particularly over... the first few decades following emission. The footprint... is greater than that for conventional gas or oil... on any time horizon, but particularly so over 20 years. Compared to coal, the footprint... is at least 20% greater and perhaps more than twice as great on the 20-year horizon*”.

Scientific evidence that CSG extraction contaminates ground water

The conclusion of Howarth et al (2011) that there is major leakage of methane into the environment during the CSG extraction process is supported by the attached peer-reviewed scientific paper, published in the prestigious *Proceedings of the National Academy of Science USA* by Osborn *et al* (2011) which demonstrates massive methane contamination of groundwater in the vicinity of CSG wells, thus confirming scientifically what the *Gasland* movie showed so dramatically. If methane leaks out, what else is likely to seep out during extraction or *after* extraction is completed?

Long term water pollution and human health hazards from CSG extraction

I am concerned about *long term* toxic effects of CSG extraction. Having witnessed the massive, costly, *ongoing* ecological devastation of the NSW coast caused by sand-mining, I can envisage comparable, *ongoing* inland devastation by CSG extraction. There is much justifiable concern about chemicals used to extract CSG and the associated *immediate* pollution. My concern is the *long-term* pollution from the pulverised coal seams that remain *after* gas extraction.

It is generally accepted that coal is rich in toxic chemicals and carcinogens including polycyclic hydrocarbons, heavy metals and arsenic, to name but a few. As long as coal retains its solid, compressed integrity (low surface-area to mass ratio) there is little or no dissemination of such toxins by ground water leaching. However, once coal is pulverised into tiny fragments, as happens in CSG hydraulic “fracturing”, the surface-area to mass ratio is increased by many orders of magnitude, leading to vastly increased rates of dissemination of toxins by ground water (either in solution, as colloids or fragments) with consequent significant contamination of aquifers. Given the extent of the CSG leases already awarded, there is the likelihood of a vast network, hundreds of kilometres in extent, of pulverised coal seams leaking toxic chemicals into aquifers and ground waters over huge areas for centuries to come. Mining companies cannot deny this probable outcome. No effective remediation would appear to be possible.

Ongoing contamination of aquifers and groundwater will have catastrophic effects on ecosystems, agriculture *and* human health. The attached peer-reviewed scientific paper by Hitt and Hendryx (2010) demonstrates that human carcinoma mortality rates are significantly increased where rivers and streams are degraded (“ecological disintegrity”) in areas of intense coal mining. To quote this work - *“Respiratory, digestive, urinary, and breast cancer rates increased with ecological disintegrity... Smoking, poverty, and urbanization were significantly related to total cancer mortality, but did not explain the observed relationships between ecological integrity and cancer. Coal mining was significantly associated with ecological disintegrity and higher cancer mortality. Spatial analyses also revealed cancer clusters that corresponded to areas of high coal mining intensity. Our results demonstrated significant relationships between ecological integrity and human cancer mortality... and suggested important effects of coal mining on ecological communities and public health”*.

Conclusion

There should be an immediate stop to any expansion of CSG extraction.

Postscript

The foregoing reflects the perspective of a 77 year old, still-active scientist, trained in ecology who spent much of his professional career in cancer research. During said 77 years, I have witnessed huge destruction resulting from human cupidity and stupidity:- overuse of pesticides and antibiotics; deforestation; land-clearing; exhaustion of fish stocks; exhaustion of oil reserves; global destruction of ecosystems; ever increasing rates of plant and animal extinctions, and finally a massive pollution producing the ultimate catastrophe of global warming.

The industrial revolution, which led to the profligate use of fossil fuels, started a mere 250 years ago – about three of my lifetimes – a milli-micro-second in the life time of the planet, yet time enough to generate said life threatening catastrophe.

Will we ever take notice and learn?

References

Howarth, R.W., Santoro, R and Ingraffea, A. (2011) Methane and the greenhouse-gas footprint of natural gas from shale formations *Climatic Change*.

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<http://www.springerlink.com/content/e384226wr4160653/>

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