

# Submission to the Inquiry into Unconventional Gas (Fracking) – South Australia

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**Doctors for the Environment (Australia)** is a non-profit, non-politically aligned, independent, national organisation of medical doctors which advocates on health issues due to environmental factors.

The vital importance of a well-functioning natural environment, with its ecosystems and other biophysical processes, to sustaining human livelihoods and prosperity, complex industrial society and, ultimately, human health and wellbeing is increasingly being recognised<sup>[1]</sup>. Consistent with this, in Australia, states evaluate the environmental impacts of developments under the Health Impact Assessment (HIA) Guidelines September 2001<sup>[2]</sup>. In these guidelines it is recognised that health is determined by many factors including, amongst others, environmental factors such as air and water quality.

It is from this viewpoint that members of DEA are deeply concerned by the serious threats posed to health by fracture stimulation (fracking) for unconventional (whether coal seam, shale, or tight) gas in the South East of South Australia. We submit this document to the Committee and confirm that we are available to appear before the Committee and would like to do so.

Our concerns are:

## **1. The risks of groundwater contamination**

**There are known, as well as currently unknowable, health problems that potentially follow the escape into local water sources of chemicals used for or released by fracking.** As the Committee would be aware, to free gas trapped in shale deposits (and sometimes coal seams), large volumes of chemical-containing liquids under percussive pressure are forced, via drilled and cased wells, into the deposits.

The South-East gas-bearing shales are said to be deep, so the fracking process itself is unlikely to directly impact shallow aquifers. However, risk exists mainly because the integrity of the wells *per se* cannot be guaranteed, and it is failure of well integrity at shallower depths that will permit release of chemical pollutants into local aquifers<sup>[3]</sup>.

It is accepted by toxicologists that many of the chemicals used in or released by fracking are unsafe for human health in high concentrations and their effects in low concentrations in underground aquifers are largely or entirely unknown. Few of the fracking chemicals have been assessed for safety by our national chemical regulator, NICNAS.

In a perfect world, drilled wells and fracking pipes would not leak, and all chemicals injected would be returned to the surface to be contained

somehow (see section 2 below). Unfortunately, in the real world, the barrier or integrity failure rate of drilled wells is significant – estimated from recent international data at somewhere between 1 in every 50 to 1 in 16 wells drilled<sup>3</sup>. The most favourable published figure for well failure is 1.88% with modern 21st century fracturing technology<sup>[4]</sup>.

Using the optimal failure rate of 1.88% and the potential for at least 250 wells in the South East of our state, the probability of failure can be calculated to be over 99% - that is, well failure can be regarded as a certainty. So, with the best regulated practices in the world, no-one would be able to guarantee a secure future for the aquifers or the communities or agriculture of the South East.

## **2. The impacts upon landscape**

**Surface release of chemicals risks ground water pollution and air pollution.** The escape of chemicals used in the fracking process and the gases released from shale deposits, poses a risk to workers and people living nearby. Volatile organic compounds and hydrocarbons (including the carcinogen benzene) are released during unconventional gas operations, from venting, holding tanks, ponds, compressors and other infrastructure. Some of these also mix with nitrous oxides from diesel-fuelled machinery, creating ground-level ozone.

In a recent report on the health of communities living around established gas wells in the USA (Colorado), there was an association between the density and proximity of gas wells near where mothers lived, and the prevalence of birth defects of the heart in children born in that region. There was a less prominent, but also concerning association with defects of the spinal cord<sup>[5]</sup>.

Other surveys of self-reported health symptoms indicate that upper respiratory (nose and throat) or skin complaints are also more frequent the nearer people live to gas wells<sup>[6]</sup>. These findings are also supported by a health survey conducted in a Queensland gas field<sup>[7]</sup>.

Reaching gas in fossil deposits involves drilling, an activity that requires significant vehicular access and clearing of vegetation for well-pads, roads and pipes. Families depend on the use of prime agricultural land or treasured natural habitat, for livelihood and enjoyment. Thus, impacts on living environments are a certain consequence of unconventional gas exploration on landscape, with many people experiencing a reduced state of well-being known as solastalgia<sup>[8],[9]</sup>.

Impacts on the landscape particularly affecting the quality of food production, critically important in the South East of South Australia, include loss of water that would otherwise be available to agriculture, and

pollution of rivers, groundwater systems and aquifers secondarily polluting stock and crops.

### **3. The effectiveness of existing legislation and regulation**

What is particularly of concern to DEA, and what should be recognised by the Committee is that 'accidental' or 'unintended' consequences will occur, and these have implications for public health that current regulation cannot adequately protect against. Prevention by avoidance of such risks is required by use of the precautionary principle.

### **4. The potential net economic outcomes to the region and the rest of the state**

In assessing the potential economic gains from the exploitation of gas, the costs resulting from consequent health impacts are being ignored. As in the mining and burning of coal, the associated costs of ill-health to local populations are often dismissed as 'externalities', but can be considerable<sup>[10]</sup>. DEA submits that the potential costs of ill-health from contamination of aquifers, land and air due to gas exploration and extraction must not be ignored.

### **5. Other**

In addition DEA asks that consideration is given by the committee, albeit outside the issues specified by the Committee of Inquiry, into the global health impact created by changes to the climate from use of fossil fuels such as natural gas. Fugitive methane emissions from unconventional gas sources have an additional direct greenhouse-gas effect more powerful than carbon dioxide, making unconventional gas and coal similar in their green-house gas impact when life-cycle analyses are done. For example, published research of methane levels inside the Tara gas field, near Condamine on Queensland's Western Downs, has found levels over three times higher than nearby districts<sup>[11]</sup>.

DEA also has the view that unconventional gas extraction, with its risks, is especially unnecessary in South Australia, where we have rich sources of clean, sustainable energy. A strong case can also be made that these renewable energy sources are not only healthier, but also economically more sustainable than gas.

A summary of DEA's views on this issue is set out in the leaflet, "*What are the health concerns with Unconventional Gas*"<sup>[12]</sup>

[http://dea.org.au/images/general/DEA\\_Unconventional\\_Gas\\_Brochure\\_v04\\_Dec\\_2014\\_Office\\_Print.pdf](http://dea.org.au/images/general/DEA_Unconventional_Gas_Brochure_v04_Dec_2014_Office_Print.pdf)

## Conclusion

In the view of medical organisations such as DEA and the Australian Medical Association (AMA), there is a lack of information on the chemicals used and wastes produced by this industry; insufficient data on cumulative health impacts, and a lack of comprehensive environmental monitoring and health impact assessments. Therefore, the precautionary principle should be applied. This means that those wanting to take an action that may cause harm, need to provide evidence of safety before proceeding.

We in DEA advocate that the Principles of Public Health as enacted in the *Public Health Act 2011 (SA)* and the SA Health Department's own '*Health in All Policies*' statement must be applied. If they were applied, we do not see how the kind of activity involved in extracting unconventional gas could proceed. The risks are potentially serious, many are difficult or impossible to manage, and could be very long-lived.

Individual gas projects need to be delayed until they demonstrably can avoid health risks. Other developed nations in similar situations have taken this view- for example, New York State<sup>[13]</sup>, the Province of New Brunswick in Canada<sup>[14]</sup> and many others.

In the meantime, unconventional gas projects should not be permitted near communities, water sources or agricultural land. The health and productivity of future generations living in the South East depends on this.

## Addendum

Since completing this submission our attention has been drawn to the document (FAQ sheet) "*Unconventional Gas and Oil in the South East of South Australia*" (Version 14/01/15).

This document is of great concern to us for the selection of references, and therefore scientific veracity, places the government in the position of proponent of unconventional gas development in a document which should provide the public with a balanced viewpoint of health risks.

We draw attention to sections on health in this government document:

*13. How are health impacts addressed?*

*14. Has there been any evidence of adverse impacts of such activities?*

There have been detailed reports on the health aspects of unconventional gas development from many countries and states within those countries. The SA document quotes two reports to substantiate its claims, the first from the Public Health Department UK<sup>[15]</sup> and the second from the Nova Scotia Independent Review Panel on Hydraulic Fracturing<sup>[16]</sup>.

The conclusions of the former are criticised in an Editorial in the British Medical Journal by US public health experts<sup>[17]</sup>.

*"The correct conclusion that Public Health England should have drawn is that the public health impacts remain undetermined and that more environmental and public health studies are needed".*

*"Furthermore, the report incorrectly assumes that many of the reported problems experienced in the US are the result of a poor regulatory environment. This position ignores many of the inherent risks of the industry that no amount of regulation can sufficiently remedy, such as well casing, cement failures, and accidental spillage of waste water".*

*"Public health is an evidence based discipline, and findings from well designed studies should form the backbone of public policy. There is also a need for an assessment of the public health infrastructure and the ability of healthcare professionals to respond to the risks presented by the development of the shale gas industry. Rigorous, quantitative epidemiological research is needed to assess the risks to public health, and data are just starting to emerge".*

The Nova Scotia Review is largely focused on economics and it is not clear whether any public health expertise was involved; the health section largely summarises the health findings of another report by the Council of Canadian Academies 2014 and puts its own interpretation on them.

It is important that the Natural Resources Committee understands that the government has used selective referencing to support its case and indeed the references used do not provide adequate support for health safety. If there was public health input into the SA FAQ sheet then it should be exposed to public scrutiny. By contrast we ask the Committee to look at two of the many other reports orientated to health (References [13] and [14] below). Reference [14] below details how the issue should be approached from a public health perspective and would lead the Committee to ask where is a similar analysis from public health experts in South Australia? Reference [13] below is the most comprehensive public health study we can find. This led to the decision for New York State not to proceed with fracking at the present time.

We emphasise that there are many other recent analyses which have resulted in a no-fracking approach at the present time, for example by France. On January 28 2015 the Scottish Government introduced a moratorium on unconventional gas and fracking while a full health impact assessment and public consultation is carried out.

The government's omission of evidence of existing health harm is also of concern to us. We draw attention to reference [5] below. This study was

well conducted and published in a highly reputable journal with deeply concerning findings on congenital abnormalities.

### **15. What are the greenhouse gas emissions of shale gas extraction?**

Rising emissions are a significant international health issue and we therefore make brief comment on this section which we regard as misleading.

Emissions from extraction are an important percentage of those from unconventional gas as a whole. In most cases full-cycle emissions from the mining, transit and combustion of this gas are only marginally better than coal and the case for its use should not be skewed by perceived economic need.

We conclude that the Natural Resources Committee has a very important role and huge responsibility in ensuring the full facts of this potential development are analysed and brought to public notice

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