

**Submission to the Standing Committee on Environment and
Public Affairs for the Inquiry into the Implications for Western
Australia of Hydraulic Fracturing for Unconventional Gas**

September 19th, 2013

Submission from:

Dr Gregory Glazov

MBBS, DFM, MFM

General Practitioner

WA member of Doctors for the Environment Australia

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Climate change is impacted by the flow from fugitive emissions during the process of unconventional gas extraction, processing, and transportation and utilization. According to the World Health Organization climate change is one of the greatest threats to public health.

The green house gas footprint of life cycle of unconventional gas is detailed by the latest paper by Howarth et al http://www.eeb.cornell.edu/howarth/publications/Howarthetal2012_Final.pdf

This paper used all available information and the latest climate science and found that that for most uses the GHG footprint of shale gas is greater than other fossil fuels on time scales up to 100 years. When used to generate electricity the shale gas footprint is worse in the decadal time scale (20 yrs time frame) but less than coal on a century scale. Considering the current urgency of the need to reduce emissions in the next 20 yrs to reduce the risk of reaching the dangerous 2^oC threshold, the decadal time frame is of vital importance. The paper reiterates that all emissions estimates are still highly uncertain and warrant more direct measurement and accounting. There is paucity of independent information and they recommend that governments fund independent measurements of methane venting and leakage. Recent gasfield emission measurements in Queensland were in a high range but interpretation was also impeded by lack of baseline monitoring. This highlights the importance of baseline methane emission measurements in any area where this industry has plans to become established. Otherwise after production starts, responsibility for fugitive emissions can be denied by the industry. At present the unconventional gas industry conveniently relies on a number of old sources which understate emissions to support their claims that shale gas is a "green transition fuel". DMP WA also relies on these sources to make this claim. The DMP WA also repeatedly uses the ambiguous term "natural gas" without specifying whether this refers to conventional or unconventional gas. Apart from fugitive emissions the lifecycle of shale or tight gas is also associated with release of many other pollutants into the environment which are ignored in statements on the benefits of "natural gas". It is even the opinion of the International Energy Agency that the use of gas and delaying the development of renewables will result in a dangerous rise of global warming. WA needs to take note of this in choosing its energy sources for the 21st century.

Health Impacts of fracking for unconventional gas – an absence of evidence is not cause for reassurance.

WADMP states that "currently there is no evidence in WA of increased adverse health outcomes associated with proximity to oil and gas operations". The proposed technology (HVHF) has not yet been used in WA, therefore historical reassurances are meaningless. Extensive quality studies will be required to assess health risks, and at this stage it is very difficult to assess long term risk. A US congress report (2011) identified that leading gas and oil service companies used 29 very toxic chemicals listed as human carcinogens, hazardous air pollutants under the Clean Air Act, or substances regulated under

the Safe Drinking Water Act for their risks to human health, as components of 652 different products used in hydraulic fracturing. The report also stated that *“it appears that the companies are injecting fluids containing unknown chemicals about which they may have limited understanding of the potential risks to human health and the environment”*. Dr Theo Colburn and her colleagues published a paper in the journal ‘Human and Ecological Risk Assessment’ in 2011, reporting that of 353 chemicals identified by CAS numbers used in natural gas operations in the US, 37% could affect the endocrine system and 25 % were carcinogenic or mutagenic. They stated that many chemicals used in the drilling and fracturing stages of gas operations could have long term health effects that are not immediately expressed. It must be noted that this list does not even include the volatile organic compounds, radionuclides and heavy metals directly released from underground deposits during the fracking process or novel and degradation products generated as a result of this process. A well known example of health effects which may present years after even a minute exposure to a carcinogenic substance is the case of the malignancy mesothelioma occurring after exposure to asbestos fibres.

It is of great concern that with the rapid expansion of the coal and unconventional gas industries, health impacts are not adequately included in the current assessment process with the “application of health impact processes under the jurisdictions of many states ... confusing, inefficient, uneconomic and often rudimentary – and the health of communities has not been adequately protected...” This is explored in detail in the 2013 Doctors for the Environment Australia report: “The health factor: ignored by industry, overlooked by government.”

<http://dea.org.au/news/article/the-health-factor-ignored-by-industry-overlooked-by-government>

Proposed moves to cut ‘green tape’ by developers and politicians who have vested interests in promoting this fossil fuel industry will further undermine public health and safety when we need to be introducing rigorous health impact assessments.

Wastewater represents a potential source of widespread environmental contamination

Flow-back fluid after fracking contains a mixture of toxic organic hydrocarbons, heavy metals and radionuclides arising both from fracking and drilling chemicals, but also from substances released from deposits underground. Proper disposal of this wastewater is expensive, difficult and in many cases not possible. With spills there is an unacceptable risk of resulting serious contamination to soil and water supplies. Related to this there is also high risk of loss from retention ponds with natural disasters such as flooding. With extreme weather events associated with global warming, these events will increase in frequency. No precedent exists of dealing with enormous amounts of this type of wastewater in WA. The fate of fracking fluid which remains in the deposit or when re-injected is unclear, and there is risk of seismic events and ongoing contamination of aquifers. There is a documented high rate of initial and ongoing failure of well casing containment. Evaporation ponds have been banned in NSW and other jurisdictions. As well as giving rise to air pollution from the evaporation of toxic volatile organic compounds, other harmful gases may be released such as Radon which is

radioactive and implicated in the causation of lung cancer. WADMP has stated that "sediment left after evaporation must be tested and disposed of at a licensed waste facility". Safe disposal of residual waste will depend on what is tested for and it is important for WADMP to specify what testing will be required. For example, naturally occurring radioactive materials (NORMs) and some heavy metals etc will pose a particular hazard and cannot be disposed of in normal water treatment plants

Water usage

The stages of drilling and fracking a horizontal well may use 20 million liters of water, which is the amount of water required to fill 8 Olympic swimming pools. The volume of water required for commercial gas fields with thousands of wells, and with the need to re-stimulate wells over a period of time is enormous. To produce a commercially viable production of gas the Mid West may require 25,000 wells and the Kimberly over 100,000. It is significant that larger volumes of water and chemicals are required to hydraulic fracture the more impermeable shale and tight sands deposits as found in WA. The present drying trend in WA due to deforestation and climate change which is likely to continue or worsen, makes water here a precious commodity. Given WA's climate and water shortage, should the unconventional gas industry be allowed to use such large amounts of our scarce water needed for more important activities such as drinking water for human populations, stock and agriculture and for future generations? There is also the risk of ongoing contamination of our currently clean ground water which together with desalination is now our major water supply. The outcome of pollution by this industry of our aquifers would be disaster for life in WA.

Many questions remain on water usage, waste water storage and risk of cumulative impacts from contamination - How does the Department of Water intend to supervise the taking of water? Where will the water be obtained and how will it be delivered to site and what are the GHG emission implications of this? Will non-potable water or salt water be used for fracking in WA? Will the ponded waste water be recycled for subsequent fracks?

WADMP also needs provide information regarding the production life span of wells and the rate of re-stimulation expected for unconventional gas wells proposed in WA and the well failure rate including in abandoned wells. High rates of well failure have been described in the US by Dr Ronald Bishop (State University of New York). [http://hydroquest.com/Hydrofracking/Bishop%20-%20NYS%20Regulatory%20Well%20Plugging%20Failure\(P\).pdf](http://hydroquest.com/Hydrofracking/Bishop%20-%20NYS%20Regulatory%20Well%20Plugging%20Failure(P).pdf)

Regulatory framework

We support the full disclosure of all chemicals used in fracking and recognize this is a positive step. This also applies to tightening of regulation to minimize risks of well integrity failure. It is also important to recognize that if a massive expansion of this industry occurs in WA and with the need to maintain well integrity over many years, the cumulative risk of failure and contamination occurring may be very high.

An expert (Dr Tina Hunter) commissioned by DMP to write a report for WADMP also pointed out that plans to ensure good environmental performance by unconventional gas projects may lack legal enforceability "attributable to the absence of resource management regulations and environmental regulations" under the State's *Petroleum and Geothermal Energy Act*. There is no reference to a Health Impact Assessment in Hunter's report. [http://www.dmp.wa.gov.au/documents/000041.jason.medd\(1\).pdf](http://www.dmp.wa.gov.au/documents/000041.jason.medd(1).pdf)

DMPWA also promotes the idea that regulations are sufficient to prevent the many harms of this industry. In fracking operations elsewhere, and despite 'strict regulations' numerous breaches occur have occurred due to accidents, ignorance or illegal activity. Small fines do not act as a deterrent to well funded companies. A recent Four Corners program displayed that there is lack of baseline and ongoing monitoring and critical depletion of vital aquifers levels has occurred with the uncontrolled growth of this industry in Queensland despite regulation by a State Government.

Doctors for the Environment Australia recommend that strict assessment for safety be in place before this industry is allowed to expand. Due to multiple risks and uncertainties a moratorium on development of shale gas industry in WA is recommended until long term safety in operations elsewhere can be established.

(i)A mandatory Health Impact Assessment (HIA), involving relevant expertise, is required in every shale gas development, including assessment of cumulative effects.

(ii)An Environmental Risk Assessment (ERA) should be mandatory. Every shale gas operation should assess risks across the entire lifecycle of operations, from water use through to the disposal of wastes and the abandonment of wells.

(iii)Robust monitoring is vital. Monitoring should be carried out before, during and after shale gas operations to detect methane and other contaminants in groundwater and potential leakages of methane and other gases into the atmosphere.

(iv)Full disclosure by companies of all chemicals used (CAS numbers) must be made in each drilling and fracking operation.

(v)Assessment of chemical additives used in drilling and fracking for safety, by the government regulator, NICNAS, needs to be undertaken prior to their use. The assessment of chemicals needs to be made in the specific context of this industry. There also needs to be determination and assessment of chemicals liberated from shale rocks by this process, as well as degradation and transformation products.