

Dear Inquiry Panel,

My name is Nell Thayne. Email [REDACTED]. I have lived in Perth for the past 39 years. I have tertiary qualifications (BA, Dip Ed, Dip Learning Difficulties), have worked for many years with children with disabilities and am now retired.

I am extremely concerned about the Unconventional Gas(UG) Industry and Hydraulic Fracturing (fracking) in Western Australia for many reasons, chiefly because I value the health of the whole biosphere, which is already under considerable stress. It's health is dependent on clean air, water, land and, I believe, clean energy.

I address several of my areas of concern in more detail below.

1. Water contamination and depletion
2. Detrimental health effects
3. Climate change
4. The absence of the application of the Precautionary Principle
5. WA's current inadequate industry regulations

### 1 Water Contamination and Depletion in a very dry state

Ours is a very dry state and clean water a most precious resource. Unless it can be scientifically shown BEFORE commencing UG activities that there is zero risk to this resource, I do not think we should proceed. (see later, the precautionary principle)

Authors of a paper entitled Surface and groundwater contamination associated with modern natural gas development SCIENCE SUMMARY Peer-Reviewed Literature, 2011 – 2014, write "Documentation of water contamination associated with modern natural gas development is a complex issue. The list of studies reported here should be seen as conservative and limited reporting of water contamination, as it only contains evidence from peer-reviewed scientific studies and does not include incidences that exist in inspection records. For instance, the Pennsylvania Department of Environmental Protection (PA DEP) released a list of 243 cases where it was determined that private water supplies were impacted by oil and gas activities. Differences in local geologies and hydrologic characteristics, land-use histories, industry practices, and monitored water contaminants can complicate comparisons across studies. *Baseline conditions for water quality are often unknown [my italics]* or may have been affected by other activities.

**Nonetheless, empirical evidence of surface and groundwater contamination as a result of modern natural gas operations is documented."**

[https://www.psehealthyenergy.org/wpcontent/uploads/2017/04/Water\\_Studies\\_Science\\_Summary\\_Oct20141.pdf](https://www.psehealthyenergy.org/wpcontent/uploads/2017/04/Water_Studies_Science_Summary_Oct20141.pdf)

In Australia contamination and spills have occurred : three such incidents are –  
- NSW (2012) Eastern Star Gas fined for pollution in the Pilliga.

- NSW (2014) Santos fined for NSW pollution. <http://www.abc.net.au/news/rural/2014-01-10/santos-fine/5194320> + <http://www.theland.com.au/story/3581836/santos-fined-over-pilliga-spill/> + <http://www.smh.com.au/environment/water-issues/epa-defends-its-actions-over-natural-uranium-in-contaminated-aquifer-20140309-34fhp.html>

- WA (2004) Amity Oil fracked a well in the Whicher Range in the south west of the state, using diesel oil as the fracking fluid. More than 500,000 litres of the contaminant remains down one of the wells. It cannot be recovered and the well will be sealed with concrete. The area overlies the Yarragadee aquifer, an important water resource for the south west.

"The Whicher Range in the southern Perth Basin is a poignant Western Australian example of the lack of certainty in methods used by unconventional gas proponents to investigate the risks to aquifers.

The Whicher Range seismic data interpretations from 2004 and 2012 draw quite different interpretations of the same data. The 2004 interpretation shows relatively little connectivity between faults and relatively little propagation of faults to the surface, hence the industry's appraisal of hydraulic stimulation as low risk at this site. The 2012 analysis of the same data shows significantly more fault connectivity at depth in the target zone and fault propagation to nearer the surface. The 2012 interpretation of subsurface structure (faulting) presents a much greater risk that the 600,000 litres of unrecovered diesel injected into the hydraulic stimulation target zone may reach aquifers near the surface." (Vogwill R., 2017, Western Australia's Tight Gas Industry – A review of groundwater and environmental risks. Conservation Council of Western Australia)

I consider that approving the use of diesel fluid (>1million litres) in a state forest close to the tourist region of Margaret River is an example of a bias in favour of the gas industry to the detriment of the local area. Note once again the lack of rigorous environmental and water baseline data.

In WA, unlike the USA, UG/fracking companies do not pay for the vast volumes of water they use.( even though each well can use, conservatively, between ten and 60 million litres of water. (Quantity figure Source: United States Geological Survey. <https://www2.usgs.gov/faq/node/3824>) Rights to access and use groundwater in WA are allocated to fracking companies on a 'first come, first served' basis with no consideration given by government regulatory bodies to the future needs of the communities, agriculture or other industries that are the permanent residents of Australia. Most Fracking and UG companies do not live here and most will exit after a few decades, leaving in many cases irreversible effects and impacts on the land and everything that lives on it.

The latest edition of the **Compendium of Scientific, Medical, and Media Findings Demonstrating Risks and Harms of Fracking** [concernedhealthny.org/compendium/](http://concernedhealthny.org/compendium/) – **1200 papers**, released in March 2018, now shows evidence of actual human harm for what were considered potential risks previously. The report confirms that fracking is not safe for public health or the climate and cannot be made safe by any regulatory framework.

Based on this scientific evidence, the Concerned Health Professionals of NY and Physicians for Social Responsibility concluded:

‘Findings to date from scientific, medical, and journalistic investigations combine to demonstrate that fracking poses significant threats to air, water, health, public safety, climate stability, seismic stability, community cohesion, and long-term economic vitality. Emerging data from a rapidly expanding body of evidence continue to reveal a plethora of recurring problems and harms that cannot be averted or cannot be sufficiently averted through regulatory frameworks. There is no evidence that fracking can operate without threatening public health directly or without imperilling climate stability upon which public health depends. Industry swore that its cracking rock technology was safe and proven, but science now tells a different story. In a commentary about fracking in the American Journal of Public Health, Weill Cornell Medicine physicians wrote, “mounting empirical evidence shows harm to the environment and to human health . . .and we have no idea what the long-term effects might be.... Ignoring the body of evidence, to us, is not a viable option anymore.” (Finkel, M. L., & Law, A. (2016). The rush to drill for natural gas: a five year update. American Journal of Public Health, 106(10). doi: 10.2105/AJPH.2016.303398)

In relation to Western Australia, Melissa Haswell, MSc PhD (London), Professor Of Health, Safety And Environment, School Of Public Health And Social Work ,Queensland University of Technology(QUT), Brisbane, has published a review - Haswell (2017) Health concerns associated with unconventional gas mining in Western Australia: A critical review available from Australian Policy Online <http://apo.org.au/node/74194>

She concluded, after examining the risks to human health associated with the UG industry and numerous scientific studies now documenting and reporting them, that the 2 Government reports which contributed to policy decisions on UG in WA did not accurately and adequately assess the risks and benefits to the health and wellbeing of Western Australians based on current knowledge.

From Queensland, a report and research from Dr Geralyn McCarron, (McCarron G. (2013). Symptomatology of a gas field – an independent health survey in the Tara rural residential estates and environs. (Internet) Available: <http://www.ntn.org.au/wp/wp-content/uploads/2013/05/Symptomatology-of-a-gas-field-An-independenthealth-survey-in-the-Tara-rural-residential-estates-and-environs-April-2013.pdf>.) a concerned GP in the Tara region of Queensland, concluded there was enough evidence of damaging impacts to human health from fracking to warrant a full investigation. Note that there had been no baseline air or water

monitoring or baseline health studies done prior to QLD government authorisation of UG/fracking operations.

#### 4 Climate Change

One of the most concerning impacts of UG and fracking is the release of the powerful greenhouse gas methane into the atmosphere. Uncontrolled release of 'fugitive' methane during flow testing of gas wells and resulting from leaks is common. However there are no regulations in place in Western Australia to limit the release of methane, and methane release does not have to be reported under the National Greenhouse Gas and Energy Reporting Scheme (NGGERS). As a consequence the vast contribution of the industry to greenhouse gas emissions is not measured or reported. (FFF Briefing p5-6)

A new Climate Analytics report released on the 14<sup>th</sup> March 2018, WESTERN AUSTRALIA'S GAS GAMBLE Implications of exploiting Canning Basin and other unconventional gas resources for achieving climate targets Bill Hare, Niklas Roming, Ursula Fuentes Hutfilter, Michiel Schaeffer, Matt Beer (<http://climateanalytics.org/files/climateanalytics-report-westernaustraliastgasmble-2018.pdf>) shows that Western Australia's gas resource emissions would be four times higher than the national energy carbon pollution budget under the Paris Agreement. It also shows that rather than risk stranded assets by investing in gas, it would be much smarter for WA to take advantage of its vast renewable energy resources.

#### 5 Precautionary Principle

This quote from Professor Melissa Haswell's Health concerns associated with unconventional gas mining in Western Australia: A critical Review p17 describes the Precautionary Principle in relation to the UG industry.

"Good health is highly cherished. Australian citizens generally believe that their state and national governments make responsible decisions that protect their health above other considerations, even where there is uncertainty. Thus many people assume that the **precautionary principle** is being applied by government, i.e., that preventive action would be taken in the face of uncertainty; that the proponents of a proposed activity would be required to demonstrate its safety, not the community; that governments would explore a wide range of alternatives to possibly harmful actions; and that government would encourage public participation in decision making. It should be noted that many public health and medical organisations are calling on governments to apply the Precautionary Principle in this situation, and refrain from allowing unconventional gas mining to occur in Australia until there is sufficient evidence demonstrating that it is safe for people and the environment.

Among these organisations are: Doctors for the Environment Australia, Public Health Association of Australia, Australian Medical Association, National Toxics Network,

Climate and Health Alliance, which includes 28 professional health bodies including the Australian Psychological Association, The Australian Council for Social Services, Australian College of Nursing and the Australian Research Alliance of Children and Youth."

I note that as time goes on however, more and more quality peer reviewed studies are being published that indicate that the UG/fracking industry is not able to demonstrate it is compatible with the health of communities or the water, air and land on which they depend. (See Compendium)

### Regulation of the UG and fracking industry

I am concerned about many weaknesses in current regulatory laws and guidelines.

(source : FFF\_170118\_Briefing\_WA\_UG\_fracking\_regulations.pdf-Adobe Acrobat Reader - from the CCWA Frack Free Future website)

For instance –

- a) Environmental Impact Assessments (EIAs) are not mandated for UG and fracking in WA. Whether an EIA is done or not is at the discretion of the EPA. I understand that to date no formal EIA has been done for any fracking activities in WA.  
"In its current guidance statement on environmental significance the EPA says if another government agency, for example the DMP, is regulating an activity then it won't be considered to be environmentally significant, and therefore won't require an EIA. This is regardless of whether the other regulating agency is actually effective in or committed to protecting the environment." (FFF 17/01/18 Briefing p2)
- b) Fracking is not covered in the list of 'prescribed premises' in the Environmental Protection Act 1984; thus is not subject to the normal pollution control regulations like other polluting industries.(eg, requiring a pollution control license). Fracking companies cannot be successfully prosecuted if they pollute the environment if their activities are authorised by the DMP.
- c) Companies conduct their own Environmental Management Plans (EMPs), monitoring of the environment and compliance reporting. According to an independent review commissioned by the WA Government, EMPs are "legally unenforceable". (Hunter T, 2011, Regulation of Shale, Coal Seam and Tight Gas Activities in Western Australia, Faculty of Law, Bond University)
- d) Much very important information is not publicly available because it is held to be 'commercial in confidence'. Vital information covered by 'commercial confidentiality' includes groundwater monitoring data, air quality monitoring data and well integrity and monitoring results.
- e) Shale and Tight Gas fracking, which is planned across large areas in WA, is exempt from Commonwealth legislation that requires assessment of groundwater impacts. This legislation only applies to CSG and coal mining proposals.

- f) "There is no single government agency in WA responsible for protecting groundwater quality, and no common groundwater quality standards in place across the state. For the majority of groundwater areas, including those supplying drinking water, no enforceable water quality standards apply at all. Bores that are used to supply drinking water for towns are often protected by a 500m buffer zone, but there is little protection for the groundwater these bores draw water from. For example, fracking has been approved in drinking water catchments for town bore fields, such as the Drover well in the Mid-west. Private groundwater bores such as those on farms have no protection from fracking." (FFF Briefing p3)
- g) No health impact assessment is required for gas fracking under WA legislation, and no baseline health studies are required in communities before fracking is approved. This makes it is very difficult/impossible to explore connections between fracking and any future health impacts, should such impacts occur.(as has occurred in QLD and the USA)
- h) The DMP has a conflict of interest. It has the role of protecting communities and the environment and also of actively fostering development of UG and fracking statewide and therefore it is not a disinterested regulator.

I consider that the current scientific evidence demonstrating multiple risks to clean water, air, land and human and environmental health resulting from the whole process that is Unconventional Gas mining cannot be ignored. And there are risks that are inherent to the industry that likely will not be preventable by even the very best regulations.

"Much talk is devoted to promises of regulatory regimes to fully protect water, prevent well failures and blowouts and reduce greenhouse gas emissions associated with UCG. However, there is little demonstration of actual, long-term cumulative safety through regulation. A referenced compilation of scientific, medical and media findings in the USA argues that regulations have not prevented significant harms, and that some harms are not preventable through regulatory opportunities<sup>7</sup>. ([7](http://concernedhealthny.org/wp-content/uploads/2012/11/COMPENDIUM-4.0_FINAL_11_16_16.pdf). Concerned Health Professionals of New York. *Compendium of scientific, medical and media findings demonstrating risks and harms of fracking (unconventional gas and oil extraction)*. 4th edition. Available: [http://concernedhealthny.org/wp-content/uploads/2012/11/COMPENDIUM-4.0\\_FINAL\\_11\\_16\\_16.pdf](http://concernedhealthny.org/wp-content/uploads/2012/11/COMPENDIUM-4.0_FINAL_11_16_16.pdf)) (Accessed 28 November 2016). Even if theoretically possible, the capacity of regulatory agencies to handle the burden of adequately monitoring and responding to many hazardous chemical, social, mental and physical health risks posed by large numbers of producing and depleted wells is uncertain." Quote from Haswell M, Bethmont A (2016) Health Concerns associated with unconventional gas mining in rural Australia. *Rural and Remote Health* 16 1-36 <https://www.rrh.org.au/journal/article/3825>

The latest edition of the Compendium (5.0) highlights many emerging trends in the research, one of which is the growing evidence that regulations are simply not capable of preventing harm. [www.concernedhealthny.org/compendium/](http://www.concernedhealthny.org/compendium/)

**In consideration of these matters, I would like to see a legislated permanent ban on Unconventional Gas exploration and extraction in Western Australia.**

In relation to the Inquiry's terms of reference, namely Describe regulatory mechanisms that may be employed to mitigate or minimise risks to an acceptable level, where appropriate

I recommend as essential : -

1. Mandatory Baseline studies of groundwater quality, depth etc, funded by the industry, performed by independent assessors to be completed before any exploration is commenced. Findings to be publicly accessible.
2. Commonwealth legislation that requires assessment of groundwater impacts is changed to include Shale and Tight Gas fracking.
3. Mandatory Independent Baseline studies in community health in the area of UG activity and health impact assessments be completed before exploration is commenced, funded by the industry. Findings to be publicly accessible.
4. Mandatory Baseline studies of air quality, funded by the industry, performed by independent assessors be completed before any exploration is commenced. Findings to be publicly accessible.
5. Mandatory Independent Environmental Impact Assessments (EIAs) be completed prior to exploration. These to include project specific impacts as well as cumulative impacts of a fully developed tight or shale gas industry. Data available to the public.
6. Change legislation so that Fracking is covered in the list of 'prescribed premises' in the Environmental Protection Act 1984 and thus becomes subject to the normal pollution control regulations.
7. Strengthen Government departmental capacity to adequately monitor companies' Environmental Management Plans (EMPs), and ensure monitoring of the environment and compliance reporting is optimal. Ensure that EMPs ARE legally enforceable.
8. Vital information relating to public safety, health and environmental health, at the present time covered by 'commercial confidentiality', (including groundwater monitoring data, air quality monitoring data and well integrity and monitoring results) must be freely available to government and the general public. Government departmental inspection and independent assessment may be needed to ensure this.
9. Set up a process charged with establishing a government agency in WA responsible for protecting groundwater quality, and developing common groundwater quality standards across the state.
10. Require post well abandonment monitoring across relevant aquifers. Further, in consideration of the long time frames for some impacts to be revealed, a trust

fund approach would ensure that resources are available for post abandonment monitoring and well failure remediation. Vogwill R., 2017, Western Australia's Tight Gas Industry-A review of groundwater and environmental risks. Conservation Council of Western Australia  
Funded by the industry.

11. The DMP has the role of actively fostering development of UG and fracking statewide. Give the role of protecting communities and the environment to another department.

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In this submission I have referred to and have drawn from 2 very extensive data collections and I commend them to the panel for the documented and frequently peer reviewed scientific evidence of the risks and consequences of the UG/fracking industry's activities here and worldwide. They contain very relevant and up to date studies.

They are :

**1. Information on Unconventional Gas Development for WA Scientific Inquiry  
Prepared by Dr Bryan Whan for Lock the Gate Alliance**

I gave Dr Fiona McKenzie a hard copy of this document at the Perth Public Meeting, 28<sup>th</sup> Feb 2018.

**2. The *Compendium of Scientific, Medical, and Media Findings Demonstrating Risks and Harms of Fracking (the Compendium)*** is a fully referenced compilation of the evidence outlining the risks and harms of fracking. [www.concernedhealthny.org/compendium/](http://www.concernedhealthny.org/compendium/)

It is organized to be accessible to public officials, researchers, journalists, and the public at large. In addition, the Compendium is complemented by a fully searchable, near-exhaustive citation database of peer-reviewed journal articles pertaining to shale gas and oil extraction, the Repository for Oil and Gas Energy Research, that was developed by PSE Healthy Energy and which is housed on its website (<https://www.psehealthyenergy.org/our-work/shale-gas-research-library/>).

The studies and investigations referenced in the dated entries catalogued in Compilation of Studies & Findings are current through December 2017.

The Compendium focuses on topics most closely related to the public health and safety impacts of unconventional gas and oil drilling and fracking. We also include in this edition a section on risks from fracking infrastructure that focuses on compressor stations, pipelines, silica sand mining operations, natural gas storage facilities, and, for the first time, the manufacture and transportation of liquefied natural gas (LNG).