

FRACKINIG INQUIRY SUBMISSION

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Although there are constant claims that the risks for onshore unconventional gas can be mitigated, or that with so called robust regulations, the risks can be managed, there is a vast amount of evidence which clearly proves, it is not possible to do so and that any attempt to try and manage the risks has proven to be grossly inadequate. It is my request that the inquiry consider the risks associated with the onshore unconventional gas industry and seriously consider why it has not been possible for governments and government departments both here in Australian and around the world, to safely regulate the onshore unconventional gas industry. I will provide evidence from a variety sources to support my statement and prove my argument, that the onshore unconventional gas cannot be regulated to a safe level. In this submission I will provide evidence as to why fracking should not be approved in WA, also why regulations are failing all around the world and why it is not possible to safely regulate the onshore unconventional gas industry.

Tight sands and shale gas often referred to as unconventional gas are trapped within complex geological formations, it is these complex geological formations which prevent the gas from being free flowing. Complex extraction technologies commonly known as hydraulic fracturing or fracking are used to extract this gas because of the complex geological formation which encase the gas. “In unconventional formations, energy deposits are dispersed over larger areas and locked in tiny pores in shale or other rock formations, [this gas is] often [extracted] through a process of drilling straight down and then perpendicularly” (International Human Rights Law & Fracking, n.d. p.7)

“Hydraulic fracturing produces fractures in the rock formation that stimulate the flow of natural gas or oil, increasing the volumes that can be recovered. Wells may be drilled vertically hundreds to thousands of feet below the land surface and may include horizontal or directional sections extending thousands of feet.

Fractures are created by pumping large quantities of fluids at high pressure down a wellbore and into the target rock formation. Hydraulic fracturing fluid commonly consists of water, proppant and chemical additives that open and enlarge fractures within the rock formation. These fractures can extend several hundred feet away from the wellbore. The proppants - sand, ceramic pellets or other small incompressible particles - hold open the newly created fractures.

Once the injection process is completed, the internal pressure of the rock formation causes fluid to return to the surface through the wellbore. This fluid is known as both "flowback" and "produced water" and may contain the injected chemicals plus naturally occurring materials such as brines, metals, radionuclides, and hydrocarbons. The flowback and produced water is typically stored on site in tanks or pits before treatment, disposal or recycling. In many cases, it is injected underground for disposal. In areas where that is not an option, it may be treated and reused or processed by a wastewater treatment facility and then discharged to surface water” (USEPA, 2017).

“Fracturing, also known as "fracking," a well involves breaking the rocks in the formation apart. Performed after the well has been drilled and completed, hydraulic fracturing is achieved by pumping the well full of frac fluids under high pressure to break the rocks in the reservoir apart and improve permeability, or the ability of the gas to flow through the formation” (Rigzone, n.d.)

The onshore unconventional gas industry is problematic because of the complex geologies trapping the gas and the inability of this industry to develop safe extraction processes. The large volume of wells required for shale and tight gas extraction, increases the risk of well casing failures, which in turn increasing the potential migratory pathways, it also increases the amount of clean drinking water required and chemicals, as well as increasing the amount of contaminated flowback/product water and increases the air emissions through flaring and venting.

Supporters of fracking say its harm to the environment can be reduced, minimized, or even eliminated by enacting strong rules and regulations, and by the use of industry-determined best practices. However, the experience of fracking to date suggests that is not true.

“A common technique for developing tight gas reserves includes drilling more wells. The more the formation is tapped, the more the gas will be able to escape the formation. This can be achieved through drilling myriad directional wells from one location” (Rigzone, n.d.).

“Among the available methodologies for extracting natural gas and oil, fracking has generated the most concern because of its potential impacts. Fracking typically includes activities ranging from drilling and cementing the well, to obtaining and injecting up to millions of gallons of chemical-laced water, to disposing of at least hundreds of thousands of gallons of wastewater per well. All such activities have differing potential impacts that must be considered. For example, water

contamination via leaks and spills is possible at each stage in the fracking process. Although differences among companies, levels of expertise, and operational standards can influence fracking’s potential effects in a particular area, the possibility of harmful impact is significant in all cases where fracking takes place.

Horizontal hydraulic fracturing uses significantly more resources than older, vertical hydraulic fracturing and carries more risks: more fluid means more truck trips, more chemicals, more wastewater and more opportunities for leaks and spills” (International Human Rights Law & Fracking, n.d. p.9.)

“[M]any potential impacts and risks of hydraulic fracturing, and that of the newer horizontal type in particular, are unknown and impossible to predict, particularly when assessing possible effects in a specific locale.

In fact, there are several characteristics unique to the hydraulic fracturing process that render difficult any attempts to determine its impacts prior to, during, and even after extraction takes place. One of these factors is that fracking processes depend upon and interact with local geology. As geological features relevant to fracking processes vary by region, by country, and even locally, anticipated geological impacts of fracking cannot be generalized. Because baselines are specific and unique at the local level, there is no way to completely standardize geological analysis and risk profiling in fracking” (International Human Rights Law & Fracking, n.d. p.10.).

The Special Rapporteur on the implications for human rights of the environmentally sound management and disposal of hazardous substances and wastes noted that:

- Excess water from oil or gas production and drilling fluids “constitute hazardous wastes.” This water is sometimes “re- injected into the reservoir ... [and]disposed of in waste ponds, which may not be lined with impermeable barriers, or even dumped directly into streams or oceans.”
- “ Toxic substances in fracking fluids and resulting mud can be released into the surface water during the extraction, transport, storage and waste disposal stages.”
- “ The storage of wastewater and other waste products may result in further contamination of water supplies due to spills, leaks and/or floods. These unintended releases can reasonably be expected to increase following the anticipated increase in the frequency and intensity of storms in the future, due to climate change.” (International Human Rights Law & Fracking, n.d. p.27.).

Known and Potential Impacts of Fracking according to the International Human Rights Law & Fracking

- Water pollution
- Air pollution
- Damage to crops and livestock
- Earthquakes
- Deforestation
- Significant greenhouse gas emissions
- Noise pollution
- Property damage
- Devaluation of home values
- Higher traffic accident rates
- Localized inflation as temporary workers drive up prices
- Risks for human life and health, and that of other species

Many risks are unknown due to restrictions on freedom of information about fracking operations

Evidence is emerging that it is difficult to manage the direct and indirect risks associated with the onshore unconventional gas industry with regulations because of the extraction technology being adopted by the onshore unconventional gas industry. With limited to no ramifications for regulations breaches and no legislation in place to protect landowners, water tables or the environmental, there is no real incentive for gas companies to adhere to government-imposed regulations. It is also proving difficult for government departments to monitor onshore unconventional gas projects due to staffing short falls. There are simply too many wells and not enough staff to manage and monitor any possible violations.

“Top violators ... told the public they would adhere to higher standards when they formed the Center for Sustainable Shale Development in 2013. Since then, those firms – EQT, Chevron Appalachia, Consol and Shell – have together committed at least 100 violations” (Inglis & Rumpler, 2015, p.4).

“Atlas Resources, based in Pittsburgh, drilled 11 wells between 2011 and August 2014 (among companies with at least five wells drilled), and was cited for 13 violations – or 1.18 violations per well drilled, ranking first. The company was followed by Exco Resources of Dallas; Halcon Operating Company of Houston; Houston-based Carrizo; and Kittanning, Pennsylvania-headquartered Snyder Brothers” (Inglis & Rumpler, 2015, p.5).

“Drilling poses major risks for our water supplies, including potential underground leaks of toxic chemicals and contamination of groundwater. There are at least 243 documented cases of contaminated drinking water supplies across Pennsylvania between December 2007 and August 2014 due to fracking activities, according to the Pennsylvania Department of Environmental Protection (DEP). Many of those cases required fracking companies to truck in replacement drinking water supplies for residents, construct new drinking water wells, or otherwise modify their existing water wells to make the water drinkable again” (Inglis & Rumpler, 2015, p.9).

“The number of violations that received citations from state officials is, in all likelihood, lower than the actual number of infractions, because of Pennsylvania’s consistent pattern of conducting fewer inspections than state rules require, and because inspectors regularly decline to issue violation notices when companies voluntarily agree to fix problems” (Inglis & Rumpler, 2015, p.6).

“The risks of fracking are significant even when fracking companies follow the rules and regulations put in place to protect the environment and human health. The threats to the environment increase when frackers break the rules.

In Pennsylvania, fracking companies violate rules and regulations meant to protect the environment and human health on virtually a daily basis. Between January 1, 2011, and August 31, 2014, the 20 mostcited companies together committed an average of 1.5 violations per day” (Inglis & Rumpler, 2015, p.13).

Moreover, these are not mere “paperwork” violations – they are violations that put Pennsylvania’s environmental and public health at real risk. And those violations have been committed by a variety of drilling companies...the oil and gas industry [has a] long track record of violating even the most basic environmental, health and safety standards.

A recent meta-review of years of scientific literature studying many aspects of fracking concluded that “regulations are simply not capable of preventing harm.” This is because the number of wells keeps growing, the researchers wrote, and because there are so many factors – including “the subterranean geological landscape itself” – that are outside the realm of human control.

More importantly, though, any defense of fracking assumes that fracking companies will actually follow all the rules. As this report documents, they don’t” (Inglis & Rumpler, 2015, p.13 &14).

“The risks posed by fracking are similar across the country, and many of the companies involved are currently drilling, or have plans to drill, in other states. The continued violation of key laws by a variety of companies – large and small, local and multinational, and even ones that had pledged to do better – demonstrates both the inherent risks of fracking and the extreme difficulty of regulating it in ways sufficient to protect the public and the environment” (Inglis & Rumpler, 2015, p.9).

“EQT Production was cited 10 times in 2013 alone for failing to plug wells it was no longer using. Plugging wells is important for long-term protection of groundwater supplies because it helps prevent pollution, including toxic chemicals and other contaminants, from migrating to nearby aquifers and other geologic layers from the wells.⁹⁸ Many improperly plugged wells also leak significant amounts of methane into the atmosphere. (Inglis & Rumpler, 2015, p.16).

Environmental and Health Violations Rank		
Company	Violations	Rank
CABOT OIL & GAS CORP	265	1
CHESAPEAKE APPALACHIA LLC	253	2
RANGE RESOURCES APPALACHIA LLC	174	3
CHIEF OIL & GAS LLC	150	4
SWEPI LP	119	5
XTO ENERGY INC	113	6
ANADARKO E&P ONSHORE LLC	97	7
SOUTHWESTERN ENERGY PROD CO	88	8
WPX ENERGY APPALACHIA LLC	86	9
SENECA RESOURCES CORP (tie)	85	10
CARRIZO (MARCELLUS) LLC (tie)	85	11
EXCO RESOURCES PA LLC	82	12
EQT PRODUCTION CO (tie)	80	13
PA GEN ENERGY CO LLC (tie)	80	14
TALISMAN ENERGY USA INC	65	15
CHEVRON APPALACHIA LLC	63	16
ULTRA RESOURCES INC	52	17
EOG RESOURCES INC	38	18
CNX GAS CO LLC	36	19
SNYDER BROS INC	31	20

“In April 2013, several of Pennsylvania’s largest fracking companies – EQT, Chevron Appalachia, Consol and Shell – formed the Center for Sustainable Shale Development (CSSD), promising not only that “safe, sustainable shale resource development” was possible, but that they would do it of their own accord.

The group said it had developed standards it claimed are more stringent than legal and regulatory requirements, setting 15 specific performance goals for operators “that are protective of air quality, water resources and climate.”¹²³ An expert analysis commissioned by the Delaware Riverkeeper Network found the CSSD performance standards deficient and often duplicative of existing requirements and practices, and concluded that they do not set a high standard of protection for the environment or affected communities.¹²⁴

And Pennsylvania DEP records show that since promising to exceed state standards, those four companies – all among the state’s most frequent violators – have failed to uphold state requirements at least 100 times.¹²⁵

The most frequent offender among these four since the April 2013 announcement of CSSD’s formation is the Royal Dutch Shell subsidiary known as SWEPI.¹²⁶ (See Table 3.) But all four have committed violations since their commitment to the CSSD. In June 2013, months after promising to look after the environment, CNX was cited for dumping industrial waste into the very waters it had promised to protect as a member of CSSD.” (Inglis & Rumpler, 2015, p.19).

Growth in Injected Waste



- In 2010 OH hosted 151 injection wells, which received 50.1 Million Gallons (MGs) per quarter in total – or **331,982 gallons per well**.
- Now, this area has 194 injection wells accepting 937.5 MGs in total and an average of **4.3 MGs per well**.

More Chemicals

Conventional: 700 to 2,800 lbs. of chemical additives per frack.

HVHHF: 205,000 to 935,000 lbs. per frack.

Typical 7-well site could receive 4 million lbs. of chemicals.

Brine On Roads: A Public Health Risk



- ODNR's brine spreading guide for local authorities notes that Ohio produced brines contain high levels of several toxic contaminants. (Pages 19 and 20):
<http://ohiodnr.com/Portals/11/publications/pdf/Brine.pdf>
- The ODNR guide states that typical oil and gas field brines contain 1,070 Mg/l (milligrams per liter) of the radioactive element **Strontium**, whereas traditional de-icers contain far less at 9.2 Mg/l. Strontium replaces bone calcium and can cause cancer.
<http://www.epa.gov/radiation/radionuclides/strontium.html>
- ODNR guide states Cadmium in Ohio brines ranges from 0.4 to 181 ug/l (micrograms per liter), which far exceeds the EPA 5 ug/l maximum contaminant level for drinking water. **Cadmium** is a known human carcinogen and can cause kidney, lung, and bone damage. <http://www.atsdr.cdc.gov/toxfaqs/tf.asp?id=47&tid=15>

- USGS analyzed samples of Marcellus Shale brine and found they **exceeded safe drinking limit for radioactivity by up to 3,600 times.**
- Cornell University report mentions family pets dying shortly after licking road applications and wastewater puddles.
- High death and stillbirth rates in beef cattle exposed to brine wastewater.

Air Pollution



- Colorado School of Public Health:

- "Our data show that it is important to include air pollution in the national dialogue on natural gas development that has focused largely on water exposures to hydraulic fracturing," said Lisa McKenzie, Ph.D., MPH
- "We also calculated **higher cancer risks** for residents living nearer to the wells as compared to those residing further [away]," the report said. "**Benzene** is the major contributor to lifetime excess cancer risk from both scenarios."

<http://attheorefront.ucdenver.edu/?p=2546>



Picture from Broadview Heights, OH

Monroe/Morgan County Overview



- Morgan County: well blow out and resulting oil spill pollutes nearby creek.
- Well pad fire in Monroe County:
 - took nearly a week to completely extinguish,
 - risked firefighter safety,
 - forced the evacuation of 25 households,
 - posed a potential risk to drinking water supplies,
 - killed more than 70,000 fish in a 5-mile long fish kill.



Morgan County



(5/14/2014) View from drill rig looking northwest. Wooden pads are being sited for clearing. Note liner underlayment in this area.

Image 107 of 152

CLOSE X

Well Blowout.

100 barrel spill of drilling mud into an unnamed creek & unknown amount of wet gas released.



(5/14/2014) Example of a seep area in stream channel on drill pad side.

Image 114 of 152

CLOSE X

Eisenbarth/Monroe Fire – June & July 2014







Ohio Environmental Council

[UNLEASHING THE POWER OF GREEN]

Monroe County – Fracking Fire & 5 mile Fish Kill

Drinking-water worries

A fire on June 28 at a wellsite in Monroe County contaminated nearby Opossum Creek with fracking chemicals. The creek flows into the Ohio River, which supplies water to nearby New Martinsville, W. Va., and other downstream communities.



TOM BAKER | DISPATCH

To simply say the risks can be mitigated and that all industries carry risk is unreasonable and beyond irresponsible. We have seen governments all around the world fail to protect water tables and fail to protect communities from water contamination, air emission pollution and direct and in-directed environmental impacts from onshore unconventional gas projects in their communities or on their land, as noted in this submission. To impose the burden of unconventional gas wells on landowners, including Traditional Landowners is immoral and unethical. Landowners should have the right to say no to gas companies and should have the right to access information about water quality on their land or surrounding water tables. The two year confidentiality clause which protects gas companies places landowners at risk and may compromise their ability to produce clean food.

“The Committee on Economic, Social and Cultural Rights (CESC) declared that access to water is important because people and communities must not “be deprived of its means of subsistence.” (International Human Rights Law & Fracking, n.d. p.23.).

“The commercial production of shale gas is the culmination of a process spanning several years, which includes exploration, drilling, hydraulic fracturing, testing and economic analysis. It is possible that even after several years of exploration and investigation, the potential resource can be found to be uneconomic. Even if the resource is economic, it will take several more years of development before full-scale production comes online. Based on overseas experience, an individual shale gas well can be expected to produce for several decades before finally being decommissioned.” (Strategic Analysis Paper, 2018, p.3).

The international human rights framework is also a useful lens through which to view and interpret rights violations of the most vulnerable and marginalized in society” (International Human Rights Law & Fracking, n.d. p.3)

“International human rights law can be utilized to contextualize, articulate and frame the connections between the practice of fracking and threats to people’s rights and wellbeing, and to their environment” (International Human Rights Law & Fracking, n.d. p.3)

Further, citizens are unable to learn the true risks of the process. Drilling companies often keep secret the identities of chemicals injected underground in fracking, as well as confidential legal settlements between drilling companies and landowners regarding alleged damages. In many instances national legislation does not require energy companies to disclose what chemicals are injected into wells during the fracking process, although many are known carcinogens” (International Human Rights Law & Fracking, n.d. p.10.)

“Human rights law ... recognizes that human rights and environmental protection depend on each other. To enjoy human rights fully, it is necessary to have a safe and healthy environment; and to have a safe and healthy environment, it is critical to protect human rights” (International Human Rights Law & Fracking, n.d. p.13.).

“States must ensure that “natural water resources are protected from contamination by harmful substances” and that water is “free from micro-organisms, chemical substances, and radiological hazards that constitute a threat to a person’s health.” (International Human Rights Law & Fracking, n.d. p.13.).

“It is also important to note that when natural gas is extracted through fracking, methane is released into the atmosphere. This powerful greenhouse gas is estimated to trap 87 times more heat in the atmosphere than carbon dioxide pound for pound over two decades.¹⁵ This debunks the myth of fracking as a source of “clean energy.” Global warming is, of course, a threat to human rights and people’s wellbeing in and of itself and environmental degradation and human rights violations tend to go hand-in-hand” (International Human Rights Law & Fracking, n.d. p.10.)

In conclusion, regulations are not providing the necessary protections being touted by the industry, regulators, governments industry representatives and industry advocates. There is no accountability in the current regulatory frameworks here in WA, in Australian or anywhere in the world. There are no real ramifications being offered as deterrents to prevent risks and protect landowners and the environment in any regulatory frameworks. Therefore, to claim the risks can be mitigated is misleading and deceptive as this is simply not the case. Without legislation in place to hold the industry to account, we are being asked to risk everything and they, the gas companies, risk nothing. I would implore the inquiry to seriously consider the impacts this industry would have on our environment and our valuable essential water systems here in WA. Water is very precious here in WA, it is not something we have the liberty to take a risk with. To simply infer the risks can be managed is inadequate, why should we be taking a risk with our water? Water is our life and without clean water we have nothing. Aquifers take 100s of millions of years to replenish, if they are contaminated or depleted they will never recharge in our life time and any contamination will be permanent.

References

Inglis, J., & Rumpler, J., Fracking Failures (2015) Retrieved from
https://environmentamerica.org/sites/environment/files/reports/EA_PA_fracking_scrn.pdf

International Human Rights Law & Fracking, (n.d.) Retrieved from
http://www.mercyworld.org/_uploads/_ckbl/files/2015/Final%20Fracking%20Guide%202015.pdf

Johns. C., Strategic Analysis Paper, (2018). Retrieved from
<file:///C:/Users/lisac/Documents/NO%20GAS%20SW%20CAMPAIGN/Scientific-Inquiry-into-Hydraulic-Fracturing-in-the-Northern-Territory.pdf>

Johnson. N., Fracking in Ohio: Environmental Impacts Regulatory Failures, [2015]. Retrieved from
<https://www.slideshare.net/OhioEnviroCouncil/fracking-in-ohio-environmental-impacts-regulatory-failures>

Rigzone, [n.d.] Retrieved from
https://www.rigzone.com/training/insight.asp?insight_id=346

United State Environmental Protection Authority, [2017]. Retrieved from
<https://www.epa.gov/uog/process-unconventional-natural-gas-production>