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Subject: Submission to WA scientific inquiry into Hydraulic Fracture
Date: Friday, 23 February 2018 11:36:11 AM

To the panel Dr Tom Hatton,Mr Philip Commander,Dr Fiona Haslam McKenzie,Dr Ben Clennell & Dr Jackie Wright

[redacted]

22nd February 2018

I am an 86year old retired general medical practioner.
[57 years in total.]
I have always been a great admirer of the wonder of Earth's nature and the balance between organic and inorganic worlds.Its ability to remain constant during my lifetime.I would like it to remain so for future generations.
I did not believe that humans were interfering with this balance ,when scientists gave early warnings of the effect on ecosystems as a result of human actions.However,after reading the book 'The Doomsday Book' written by Gordon Rattray Taylor, published in 1971,with solid references i was utterly convinced that 'World Ecology' was under serious threat as a result of human activity.

My submission regards only one subject,that of Unconventional Gas production by Hydraulic Fracturing. I strongly believe this is one of the present threats to our survival.

Crossing the Rubicon

For life to exist on this planet there must be
a] An adequate oxygen level
b] Enough potable water
c] An adequate food supply.

INCREASED POPULATIONS & ENERGY REQUIREMENTS?
I I
The degree of pollution of our world appears to be directly proportional to the increase in population .
The Earth's population has increased from one billion in 1850 to 7.6billion in 2017. (Ref.Doomsday Book, world population growth by Max Roser & Esteban Ortiz-Ospina 20130 .]
It is expected to keep growing and estimates have put the total population to reach 9.8 billion by 2050.
FOOD & POTABLE WATER WILL BE REQUIRED, as will ENERGY .
As it is we are already running out of water ,look at South Africa NOW!

In prehistoric times humans existed in small numbers. When fire was discovered 'the dye was cast'.
Most of the energy requirements of the Earth have historically been from the process of combustion of fossil fuels. This has produced a large quantity of carbon dioxide , released into the atmosphere , and with methane is considered a major contributor of 'green house' gas responsible for climate change.
Countries are already suffering the consequences of extremes of temperature,rainfall, droughts & flooding.
We need to be investing in renewables NOT the extraction of more fossil fuels for the short term economic benefit of gas & oil conglomerates.

Ref: Health and Climate Change Commission 2015.The Lancet 38, no10055. methane is a greenhouse gas considered to be 'more powerful' than carbon dioxide.

IMPACTS ON AIR

a] Methane levels surrounding gas mines are 3 times higher than background values.

b] There is considerable excess atmospheric methane levels in the Surat basin with methane bubbling from the Condamine river.
c] Volatile chemicals used and the gases released pose adverse health risks to workers and people living nearby.
d] Emissions of compounds have potential adverse health effects e.g 44hazardous air pollutants in one study.
e] An infrared camera demonstrated substantial gas emissions from vents in Qld,contrary to industry claims.

Ref: Toxic chemicals used in Australian fracking processes; Natinal Toxics Network. April 2013
http://www.tai.org.au/content/economies-shale

Ref: Forcey [2017]. Methane emissions in the Qld.coal seam gas fields .Tim Forcey Independent Energy Advisor.

IMPACTS ON WATER

A single shale gas frack uses 11-34 million litres of water in the fracking fluids.Wells are often fracked on multiple occasions,sometimes up to ten times, multiplying overall water use.Some of this fluid returns to the surface as flowback,but most stays underground and is never recovered-estimates suggest 70%or more remains underground.
The 'flowback' may contain toxic pollutants such as heavy metals,salts,radioactive materials and volatile organic compounds .the 70% left underground May well come to contaminate deep aquifers.
The industry claim that because shale & tight gas extraction involves deeper rock layers ,they are safer than gas extraction from shallow coal seams. A European Commission report refutes this!

In USA
Private drinking wells have been contaminated.
There are elevated levels of methane in groundwater
High levels of arsenic,heavy metals and salinity in bore water close to shale wells.

In Australia
Spills in NSW's Pilliga Forest contaminating groundwater with uranium & arsenic.
Methane gas bubbling in Condamine River Qld.
Numerous offences by Origin Energy ,Santos Star Gas in NSW,NT & Qld for waste water spills,using unlined waste pits that then flooded . Leaks from all parts of the operations,discharging polluted water into a creek,polluting an aquifer with radioactive uranium and toxic heavy metals,& killing vegetation & wildlife with untreated toxic coal seam gas wastewater.
The penalties imposed were minimally and laughable!

Ref: Excerpts from Compendium of scientific,medical,and media findings demonstrating risks and harms of fracking 19th January 2018. Excerpts on water contamination,
http://www.psr.org/assets/pdf/fracking-compedium-5-water-excerpt.pdf

Ref: Broomfield Mark,Support to the identification of potential risks for the environment and human health arising from hydrocarbons operations involving hydraulic fracturing in Europe.AEA Technology 2012

Ref: Fracking: A serious concern for surface water as well as groundwater:
http://ec.europa.eu/environment/integration/research/newsalert/pdf/275na3.pdf

IMPACTS ON LAND

As populations grow there will be the need for more good agricultural land to continue providing food.
As it is, prime agricultural regions have been transformed into industrial areas through coal seam gas in Qld.In Qld,18000 wells have been approved,and tens of thousands more are planned.
The impact on the land and the industrialisation unconventional gas production creates is clearly seen in a series of 'Before and After' photos of various forest & agricultural areas in Qld.

The background paper for the WA Inquiry claims that the footprint for unconventional gas will have a smaller footprint than coal seam gas. Australia's former and present Chief scientist,Professor Chubb & Dr Finkel, have both admitted that Australia's unconventional shale gas industry will have a larger footprint and require considerably more water than CSG.

Evidence arising in the past 18months has demonstrated links between fracking and waste fluid reinjection with

seismicity earthquakes.

Ref: Dutch Groningen province plagued by gas extraction earthquakes,compensation on way for damage to 900 homes 12th Jan 2018
http://www.france24.com/en/20180112-dutchhh-hasten-plans-pay-damages-after-gas-field-quake

Ref: Atkinson,G.M.,Eaton,D,W.,Ghofrani,H., Walker,D., Cheadle,B.,Schultz,R. Kao.H.[2016] Hydraulic fracturing and seismicity in the Western Canada Sedimentary Basin.Seismological Research Letters, 87[3]. doi:10.1785/0220150263.

The Netherlands and the Canadian Provinces of New Brunswick,Newfoundland,Nova Scotia and Quebec as well as a number of other countries have banned unconconventional gas extraction .

The large footprint of unconventional gas infrastructure represents a serious threat to biodiversity fragmentation through direct clearing of bushland,loss of native vegetation,,spread of invasive species of weeds & increased fire risk .

Ref: Excerpts from Compendium of scientific,medical,and media findings demonstrating risks and harms of fracking 19th January 2018. Excerpts on water contamination,
http://www.psr.org/assets/pdf/fracking-compedium-5-water-excerpt.pdf

Ref :.Minnick,T.J.& Alward,R.D.[2015].Plant-soil feedbacks and the partial recovery of soil spatial patterns on abandoned well pads in a sagebrush shrubland.Ecological Applications 25[1] 3-10

Ref: Allred,B.W.,Kolby Smith,Tridwell,D., Haggerty,J.H.Running,S.W. Naugle.D.E., & Fuuhlennnndorf,S.D. [2015].Ecosystem services lost to oil and gas in North America .Science,348[6233], 401-402.

HEALTH IMPACTS

Although Governments and the gas industry try to convince us that unconventional gas extraction is 'safe & clean' ,there appears to be overwhelming scientific data that contradicts this claim.

Ref: Adgate,Goldstein and McKenzie (2014) Potential public health hazards,exposures and health effects from unconventional gas developments. Environmental Science and Technology 48: 8307-8320.
https://pubs.acs.org/abs/10.1021/es404621d

Ref: Compendium of Scientific,Medical and Media Findings Demonstrating Risks and Harms of Fracking. Fourth edition.Nov.17, 2016.Physicians for Social Responsibility.
http://www.psr.org/assets/pdfs/fracking-compendium-4.pdf

There is also evidence of harm to animals ,mainly resulting from contamination of water wells, springs,ponds or creeks ,some due to accidents or negligence,and others a consequence of normal operations. On seven cattle farms studied (USA) in great detail, half the herds ,on average were affected by death or failure to breed.

We mustn't forget historical claims made by the Tobacco industry telling us how 'safe and beneficial ' to one's health was smoking .As a G.P I have seen the consequences of smoking on health. I do not want to see a repetition of this.

CONCLUSION

The Government should ban Hydraulic Fracture Stimulation in Western Australia .(ultimately in all Australia.)
There is overwhelming scientific evidence of the damage Hydraulic Fracking causes to the environment.
All exploration licences MUST be revoked & never reinstated.
We must follow the lead of other nations,

It is my opinion that Hydraulic Fracturing will tip the balance of nature from which there is no recovery .

Richard Reynolds
Sent from my iPad