

**Scientific Inquiry into hydraulic fracture stimulation in WA
Dandaragan Public meeting – 2 March 2018**

1. INTERESTS REPRESENTED

- Traditional Owners
- Agriculture
- Horticulture
- Beef, wheat, sheep
- Farming with experience of exploration wells on land
- Local contractors servicing local agriculture
- Local and regional community
- Scientific research
- Moora Catchment Council
- Natural Resources Management
- Industry employee
- Sand mining and quarrying industries
- General environmental interest/concern
- Tourism

2. SCOPE OF DISCUSSION / ISSUES TO ADDRESS

- a) Scientific analysis of risks: environmental, health, agricultural, heritage and community.
- b) Describe regulatory mechanisms that may be employed to mitigate or minimise risks to an appropriate level.

3. CONCERNS / RISKS

5.1 Water

- Essential/critical/irreplaceable value of water for the environment, flora and fauna, farming, stock, cropping, food production and life; dependence on available, clean water is paramount
- Water is life and any/the slightest risk to water quality and quantity is too great; there is no alternative to water – Precautionary principle
- Regional communities are totally dependent on bore water; can't totally remove risk and this is in an area where the consequences of water loss or contamination would be catastrophic for the community; negligible risk is still too high

Water quantity

- Concerns about water-table drawdown by industry; fracking will compete with existing multiple users for water resources, including town supply, domestic use, horticulture, broad acre agricultural production

- Decline in water availability, bores running dry, rainfall declining - high cost of deeper/new bores, even if not contaminated
- Farm management practices are changing to accommodate drying climate and reduced water
- Tracks and infrastructure interrupt natural water flow

Water quality

- If groundwater system contaminated, will be unable to sustain property and livelihood
- Exploration permits granted over the regional water supply – fear of contamination
- The Western Australian aquifer system is complex, extensive and interactive, meaning that contamination in Moora could impact on the Perth water supply/ Yarragadee aquifer in the south
- Running freshwater creeks and availability of potable bore water, good soil type and frost free climate provide the conditions required for agricultural production; Horticulture, agriculture and agricultural industries in the area are changing, moving towards food bowl status because of the clean and reliable water, its proximity to Perth/markets, and the loss of Perth market gardens; new avocado crop (water sensitive), potato (10% of State's potato market) and citrus developments in the region
- Numerous geological fault lines make fracking outcomes unpredictable in relation to water contamination
- Chemicals used are mostly noxious and incompatible with the requirements of the National Health and Medical Research Council for use in Public Drinking Water Supply Areas

Water experiences

- Industry monitors water quality in bores and test wells
- Host farmer to 2 exploratory wells has his water supply monitored for quality; Company sends water samples to lab for testing and results go to government and the farmer, who also monitors the water quality; permanent caretaker monitors waste pond, which is lined with plastic, and has never run over
- Local water bores are deep in this area, and they go through the water table; chemicals are used in drilling for water as well as fracking
- Jurien Bay – issue with bore water 4m deep; water levels dropped; petroleum in well; bore had penetrated a fissure and oil escaped into bore water; fracking will make movement in fractures/fissures and make oil/gas leakages worse
- Eneabba borefield, 300m deep; one bore failed; no reduction in water but gone through coal seam and shale entered water supply
- In Woodridge, surface aquifer bores have been contaminated by leachate from market gardens, and they now have to go down further to the Leederville aquifer

- Experience of farmer – 3 bores 200m deep for stock water; bore water is acidic and salinity is just below what is suitable for animals; bores require much maintenance
- Impacts of high rainfall – uncertainty about sub-surface; pump from soak, water became opaque after 60mm of rain in January

3.2 Air quality

- The emission of chemicals used in the process and naturally occurring substances, including methane, sulphur and the BTEX (Benzene, Toluene, Ethylbenzene and Xylene) group, contaminate the soil, air and water;
- Air pollution from flaring and gas leakages; concern that flaring is not always at a high enough temperature (flame colour) to burn emissions, which end up in the atmosphere, on the land and in the water
- Compounded by prevailing winds carrying emissions into towns, contaminating rainwater supplies and increasing the rate of tank corrosion;
- Farming and growing cycles already impacted by greenhouse gases and climate change; fracking air emissions more deadly
- Air pollution may turn out to be as big a problem as salinity
- Host farmer to 2 exploratory wells has air quality monitored (by company)
- Dongara gas flares, 24 hours/day 7 days/week impact community with noise, vibration, pollution
- Greenhouse gas emissions from methane leakage (wells and infrastructure)

3.3 Human health

Emissions/chemicals

- Human and animal health risks from water and air pollution, migration of gas and chemicals, toxic emissions
- Hydrocarbons escaping into the environment
- Fracking waste materials, particularly those with background radioactivity
- Cancer survivor - changing farming practices to reduce chemical input; concerned about chemical overload
- Lack of a health database: difficult to track illness cause/effect; high rates of cancer/auto-immune disorders
- Mechanical agriculture and farming practices are affecting health, but not recorded; already loaded with chemicals and fracking would be the tipping point

Noise

- from drilling, truck movements, off-gassing, venting/flaring

Mental health

- Farmers wanting to improve their health, but often not willing to discuss; fracking adding to debt and stress levels (slaves to creditors), high suicide rate, high pressure/mental health pressure; health of region put under pressure; tipping point/additional load; look after the community with preventative health
- Anxiety, stress and fear, suicide

3.4 Environmental health

Cumulative impacts

- Interconnectedness of water, air, land and cumulative impacts of deterioration of one on the other
- Severe environmental impacts over time from sand mining; concerned about clearing and salinity from fracking
- Unintended consequences, such as fracking waste materials, toxic wastewater

Reserves

- Loss of nature reserves and wetlands
- Badgingarra National Park, Mt Leseuer, Beekeepers Reserve
- Close to a world heritage area
- Object to going on an A Class Reserve and knocking down trees and do nothing;
- Industry is undertaking surveys in the Badgingarra National Park

Clearing

- Concern regarding clearing and the destruction of good farmland
- Seismic investigations have done indiscriminate clearing and seismic grids are being run without permission (aeromagnetic)
- Rehabilitation is not believable
- A petroleum company has remediated seismic lines; aided by school children

Salinity

- Salinity has increased due to increased clearing
- Will there be an increase in salinity with fracking clearing?

Invasive species

- Weed introduction by fracking industry is a concern and increases the need for enhanced quarantine and protection of land access, particularly if horticulture is to expand

Subterranean fauna

- Consider big picture geology; underground limestone caves in the Jurien Bay area; drilling may impact subterranean fauna

Terrestrial environmental quality

- Current clean and pristine environment supports claims to be organic farmers and producers; will be compromised by fracking
- Concern about food quality, e.g. demineralised/less nutrient content; Epigenetics – decrease in mineral density of food, decrease in nutritional content
- Concern that fracking is killing microbial activity in the soil, which impacts on farmers' land and livelihood
- Woodridge is an area of native banksia woodland, tuart eucalyptus, grass trees, etc; and in the event of bushfire, is now listed as 'catastrophic'
- Underground fracking puts pressure on the above ground environment
- Concerned with ponds and potential for flooding; if ponds in wrong landscape position, susceptible to erosion and adverse weather events; no long-term containment
- Linear infrastructure (roads, pipes) interrupts surface water flow and leads to fragmentation and destruction of habitat and ecological impacts on fauna/birds (spiny anteaters, kangaroos, emus, honey possums, bird life)
- Escaping gas, flares, natural seepage, all impact local environment and some of the issues may be generations away

Seismic activity

- Petroleum company continuously monitors seismic activity with sensitive machinery; low risk of earthquakes
- Earthquake risk; tremors have been felt in WA; concerned that fracking will cause geological issues; damage can be intense and widespread
- The Darling Fault Line sits within the area for potential fracking
- Research into quakes in Perth and Midwest – since 2010, felt 27 earthquakes in WA, some reaching 5.8 on the Richter scale
- Perth same as Christchurch
- Meckering (west of Moora) earthquake in 1968 destroyed bore casings; Koorda small tremor broke local paths; Moora has had 3 tremors since Christmas
- Fracking proven to induce quakes in Holland, Canada and USA; seismic exploration killed plankton in Tasmania
- Induced seismic activity in the area, which is prone to quakes, would have high consequences

3.5 Fracking process

- Concerned about fracturing technology
- Methods and materials used are risky to water quality and quantity

Method

- Concerns about the integrity of bores/wells; corrosion of underground casing
- Well failure in WA is 11.7% (WA government data) and 7% in first 12 months; in other places, 100% over the life of the well – risk too great
- Bores/wells require much maintenance; concrete and steel bore casings erode; concrete tanks used to store bore water have only lasted 5-10 years because of corroding, but rain storage tanks have not corroded
- Surface spilling
- A lot of limestone in the area; rock plus cement interaction corrosive; possible bore contamination, but difficult to prove
- Industry accepts that the potential for problems is part of all extractive industries, not just fracking
- Concerned about accidents, short cuts, cover ups and the inability of small fracking companies to stringently implement rigorous practices
- Storage and management of back-water – risk to fauna, flooding and over-flow
- Flares starting bushfires – risk to property, loss of vegetation
- In the Whicher Range there is still 600,000L of diesel left underground; it was used as a fracking fluid
- Petroleum industry has been in the area: oil wells have been blocked off because now have North West Shelf oil and gas. There is still a lot of oil in there
- Very high hydraulic pressure is needed to fracture rock

Materials used

- Highly toxic chemical mix used, interactions are uncertain and some are carcinogenic
- Evidence of well leakage throughout the world and uncertainty about the underground transport and fate of chemicals

3.6 Country/community/amenity

Aboriginal cultural and spiritual matters

- Disappointed that welcome to country by Traditional Owners not completed; custom is not to destroy land; can't live without water; the land is our mother; major Aboriginal heritage sites in country – Moore River, Hill River and Millenyu Brook (has multiple birthing sites, precious to women)
- Moore River native settlement has 57 mining tenements pending; they even want to explore the cemetery!

Amenity

- Decrease in quality of rural life and amenity
- Invasion of privacy

- Interference of roads, seismic investigations, pipes and wells compromises and disrupts agricultural business and ability to farm
- Climate change is impacting on crop production so the farmers are now instituting controlled traffic on broad acre production systems (with no physical barriers); roads, waste water dams, pipes and wells, all interfere and negatively impact on agricultural production

Sense of place/community

- Threat of fracking is scary, there is a fear in the community of the results of the industry; they can see the gas flaring from the house
- People care for country, have a sense of place, and maintain it for future generations
- Water is part of a sense of place, not just economics
- Regional World Heritage Areas are a part of the community and would be at risk
- Generational farming makes for a very deep sense of connection to the land, making it priceless and of more than economic value; what security is there that land will be sustainable and productive in future if fracking moves in
- Intergenerational opportunities for farming in the area are potentially compromised
- Fear of 'industrialisation', water contamination, depletion of water resources, loss of productive land, land degradation, reduction in land value
- Landowners are selling off because of the threat of fracking, breaking up the community and potentially devaluing the land
- A fracking industry in the region will devalue the land, make the community less attractive and deter prospective farmers and workers in the agricultural industry
- Want an outcome that will benefit the community and Western Australia, but does not appear to be any benefit for the local people in jobs or local investment
- Very few jobs created by the petroleum companies; Agriculture provides for more local jobs than fracking; horticulture is high value and offers good jobs and excellent returns; more people employed in horticulture than there ever will be in fracking, and these jobs are based on a renewable industry, not a finite resource such as gas; agricultural contractors live locally and invest locally and their children will stay in the community
- Gas companies do not buy locally, but buy bulk from elsewhere
- Agriculture is a self-funded industry, making good food for Western Australia and supporting their families and the local community
- A petroleum company has had a positive impact in the Badgingarra community over the past 10 years; company has explained the process, has regular community and school briefings on environmental and production concerns, is open, transparent and accountable in all dealings

and information and has been reasonable, factual and scientific in its dealings with community members

- The company uses local vendors where possible, employs local people where possible, including environmental jobs, community liaison and support roles;
- The company sponsors the local school and community, providing both economic and social benefits over time; \$90 million on gasfield to date; excess of \$6 million in Badgingarra community
- In shifting drill rigs, company stopped trucks (55) while school bus on the road

3.7 Philosophy/ethics/natural justice/policy concerns

Philosophy

- Tread lightly on our earth, as its guardians
- Respect for Traditional Owner culture not understood; traditions are followed like law and are at risk of being compromised by industry
- Feel responsibility for stewardship of land for today and future generations and their legacy – intergenerational equity
- Look after natural resources; mustn't work against nature, work with it; fracking works against nature

Ethics

- Water is the most precious resource and in such a dry continent, it is too risky to mess with it; What are the alternative water sources?
- There are alternatives to unconventional gas; there is no alternative to water
- Wasting fresh, clean water on short-term mining/fracking
- Everyone has a responsibility to protect the air, water and land, including government and the industry

Natural justice

- The right to clean water is a basic human right, and clean groundwater is certainly part of this.
- The whole of Western Australia has been broken up into permit areas. They do not ask the people. It is scary to see that this has taken place. That gives them the right to explore. This process has highlighted what has been going on for years
- Farmers have no rights in terms of being able to say yes or no to people coming on their land to carry out fracking, given the Oil and Gas Act
- There is an unfairness in the industry being allowed to take our land and water; they do not pay for water; why do we have water meters? Farmers are being asked to monitor water extraction, but not the fracking companies. We are regulated, not them. There are more regulations to start a piggery than to frack.

- Legislation does not sufficiently protect the landholder; concerned about land access and having land access curtailed by the presence of oil and gas companies; loss of farmland from infrastructure – ponds, pipelines, roads
- They pump thousands of litres of diesel in the hole to set the mud and it is called a “quick gel”. Farmers cannot do that with diesel.
- Challenging the government and the industry is expensive

Policy

- Fracking is incompatible with current land use
- Community survey results predominantly against fracking in Dandaragan region
- Not happy with public funding of gas exploration
- Gas is a transition fuel between fossil fuels and renewable sources, whereas water is a continuous requirement. The amount of gas currently being generated in northern Western Australia and exported would be enough to transition; move faster to renewables
- Dampier Bunbury Natural Gas Pipeline is currently under-utilised; Western Australia does not need additional gas reserves
- Why frack for gas when there is plenty of gas up north, and they ship it overseas and they pay more for gas in Perth than overseas
- With foreign ownership, Australia gains little from gas and coal production. It is like we are giving it away and wearing all the risk.
- So many states have decided that they will not support fracking; why are we not learning and making use of all the inquiries from these states? It is like we are trying to reinvent the wheel.
- Why is the South West excluded from fracking but not other places? Is it votes and money?
- Concern that the broke government will choose oil and gas revenue over the environment

Experience

- Past experience with the industry has been negative and diminished trust in and respect for the industry; for example, industry being loose with the truth and not believable, promising jobs but bring in skilled workers, requiring confidentiality in discussions with landowners on matters of compensation; property damage to water bore and concrete tank during seismic activities and no responsibility taken by industry
- Petroleum company wanted access in Dandaragan Deep area to undertake flora and fauna survey, family preferred not to, and were told that the local Moora magistrate could mandate access by the company, ‘so cooperate or get involved in the legal system’; compensation discussed was inadequate
- Wyoming farmer has more credibility than industry
- Companies dividing the community; difficult to knock back a good offer

- Farmer host to 2 exploratory wells has had good experience, with industry being cooperative and efficient in agreements, informative about the process and chemicals used (same as in a swimming pool); smell of burning during 8 weeks of flaring; small oil leakage cleaned up, land decontaminated and returned to farming land

Risk assessment

- Risk in terms of economics: do the economics stack up of gas extraction v. water used in fracking and risks of contamination etc
- Compare the risks from fracking with other regional activities, e.g. sand mining, diesel use, sprays, fertilisers, etc. This particular fracking is toxic from go to whoa.
- There are less risky alternatives to gas; Prepared to give up some of their land for solar farms if that would negate the need for fracking
- The price of a well failing is too high and the cost is unknown and potentially too high for people, communities and businesses; too many risks – Precautionary Principle

3.8 Information/communication issues

Community

- Community wants full knowledge and confidence in that knowledge
- No guarantees are being given to the community, farmers and business owners that there are no future impacts

Government

- Concern that government departments not communicating, e.g. mining, petroleum, water, food people
- Inconsistencies within Government; Department of Water and Environmental Regulation (DWER) monitors vegetation clearing well, but water contamination is not monitored; no confidence in regulators; DWER works out of petroleum company offices!
- Lack of a unified government policy for the area and lack of discussion between mining, petroleum, agriculture, water and environment portfolios; Water for Food is an opportunity to develop the food/agriculture sector but is at risk from industry; incompatible land uses
- Are there plans for exploration near Moora bore water?
- Government monitoring is inadequate – reactive regulation is too late; no confidence in government to adequately manage regulation
- DWER doesn't have any information on chemicals used and acceptable levels

Industry

- A petroleum company Chief Executive Officer did not know they were near the Moora town water supply and when challenged, passed it off as a Department of Water responsibility

- Industry lack of knowledge about the Moora area and location of the aquifer
- Industry without understanding of how agriculture works and what is needed to ensure excellent food production
- Cannot trust credibility of companies to produce information
- Working group meetings: regulators come in and do a 10-minute presentation; industry comes in and don't allow time for questions; industry comes to working groups with continually changing names; makes for confusion and people will not engage
- Host farmer to 2 exploratory wells – has regular visits and communications with the company
- Farmer had good experience with a petroleum company bore in Greenhead; explained outer bore, inner bore and fill with cement

Knowledge gaps

- Geology of the area is a “guestimate”; a petroleum company 3/4 hit fault line in previous drilling (Leighton) and became a “troublesome well”
- Insufficient knowledge and understanding of water movement underground and interconnectedness of water sources in the Perth Basin; poor understanding of aquifers, their age, water sources, flow patterns, replenishment rates
- Interactions of contaminants; how they mix; lack of documented studies
- Unknown impact of combined chemistry of hydraulic fracture fluid and sub-surface materials, and flow-back water chemistry
- History of exploration and fracking wells in the region, including compliance reports, monitoring results, inspections, failure rate, leakages
- Make reporting information available online and current
- Uncertainty about scale of impact and cumulative impact

4. Regulatory considerations; What regulatory mechanisms may be employed to mitigate or minimise risks to an acceptable level?

4.1 ‘Safest’ option

- Don't want a regulatory environment because there should be no fracking in the Dandaragan area
- “Regulation is just an industry term; things still go wrong”
- If regulated properly, fracking wouldn't happen because the industry would not be able to meet the requirements
- Due to high risk, preference is that the moratorium on fracking should be permanent and West Australian wide, not just South West
- No confidence in regulations being implemented fully and not changed/eroded in the future

4.2 Regulation framework

- Industry believes that they are highly regulated; alternatively,

- Independent regulator
- Prescriptive regulations
- No self-regulation
- Regular inspection of gas wells
- Frequent public reporting
- More robust Department of Health, Department of Water and Environmental Protection Authority assessments
- Include a clear statement of acceptable levels for air quality, water quality and soil quality
- Industry to pay for water
- How to regulate for natural weather incidents, human error?

4.3 Land access

- Property owners should have the right to say no to access by the industry
- Any access to land should address quarantine matters, such as weeds, chemical spills, etc, particularly in horticultural areas
- Protection for farmers from horizontal/lateral/diagonal fracking that penetrates under their land

4.4 Modelling, baseline studies, monitoring, analysis and public reporting

- Modelling should take the long-term into account as some of the issues may be generations away
- Prior to any industry activity, undertake independent baseline studies of water, soils, human health, animal health, air quality, vegetation health
- Constant and independent monitoring to be undertaken before, during and after fracking
- Continuously test farm bores, air quality, everything around the area, before, during and after
- Monitor methane release, people's health, incidents of asthma and cancer

4.5 Chemicals

- Full listing of chemicals permitted to be used
- Peer reviewed testing of all chemicals to be used

4.6 Long term responsibility

- Companies to be more accountable
- Risk timeframe: should think in terms of hundreds of years, given the groundwater movement in aquifers; it may be several generations away.
- Require an adequate bond that is applicable regardless of changes in corporate ownership or commercial arrangements and transactions so that legal and environmental responsibilities cannot be abrogated, e.g. through declaring bankruptcy, going into receivership

- Industry, and not the community, should be responsible for the restoration and rehabilitation of impacted areas, and maintaining rehabilitated areas until established, and the long-term impacts to the environment
- Industry should be responsible for long term maintenance of wells and infrastructure, including after they cease to be used

4.7 Legislation

- Current legislation gives the oil and gas industry the right of veto and few rights to landowners
- Land Access Agreement is old and contradicts the Mining Acts – need to be updated
- Farmers and landowners should be given the right to say no to access
- Petroleum Act does not have provision for a bond
- Legal challenge to the authorities and industry should not be so expensive as to put it out of reach of the little guy
- Fracking comes under a different Act from the mining Act. Why? That makes me uneasy about the regulation
- Exclude from fracking sensitive areas of agricultural production, especially food production

4.8 Insurance/penalties/compensation

- Sworn evaluation of properties before fracking so that devalued farms and landowners can be compensated
- Current Government booklet on fracking regulation lists penalties for contravention of environment regulations and contamination of water, but the penalties are minimal and of no consequence; penalties must ensure that farmers and land owners are properly protected
- The penalty for contamination of air, water or land/breaches of regulations must be very high
- Compensation should include not only land used by industry (at current values), but also other land disturbed and the economic value of disruption to farming practices
- A local petroleum company supports bonds/funds to address community concerns
- Mandatory insurance by companies to cover relocation in the event of contamination, including horticulture businesses
- Burden of proof in relation to, e.g. cause of bore contamination
- Provide for prosecution for bore water contamination, with the penalty consistent with the catastrophic consequences for the environment

5. REFERENCES, INFORMATION SOURCES CITED/REFERRED TO

- Visiting farmer from Wyoming, United States, on his experience – ill health, destroyed potable water source, stock water contaminated, negligible compensation, industry has no respect for the community
- Industry meetings - Badgingarra
- An international association of hydrologists concluded in 2015 that it is not possible to have certainty against well failure – Anthony Inglezi and New South Wales Inquiry
- Movies on the United States' experience
- Report for “Water for Food” project undertaken on the area? Looking at the potential for further irrigation; The government report on the area as one for the “Water for Food” project has just been completed and is about to be published. It looks at the potential for further irrigation, for horticulture
- Example from down south – leaving diesel down a well; documented by the Department of Environment
- Mentioned peer reviewed papers on scientific evidence, but not cited
- Experience of fracking in northern New South Wales and Queensland
- Australian Petroleum Production Exploration Association (www.appea.com.au) addresses questions on gas well integrity, leakages in publicly available information
- Fracking experience of Dongara, for 40 years
- Film, ‘Fractured Country’
- Dandaragan Shire completed water analysis for the community in 1992
- C. Masey, “Call of the Reed Warbler”; book describing slow violence, cumulative impacts, desertification, soil degradation
- Paper – Norwegian Safety Authority
- John Fenton’s testimony
- Some people had the view that the Department of Water and the Department of Health view that fracking should be banned in water supply areas

6. ATTACHMENTS

6.1 Documents provided at the public meeting

1. Written comments, Woodridge
2. Seismic readings in WA, 2010-2017
3. Written comments, Woodridge

My name is [REDACTED]. I live in Woodridge which is located in the Moore River Region. What a beautiful place to bring up 4 nature loving children, teaching them to appreciate and respect mother earth and her wonderful gifts.

I have always protected the environment where I can and the more I have learnt about fracking and the negative impact it has on the water, air, soil, environment and the livelihood of people the more it sickens me that our government would even consider letting this happen in W.A. Air pollution, contamination of underground water, Toxic wastewater, loss of large areas of farmlands, wetlands and nature reserves. The list goes on. There is **NO** way you can tell people this is a safe practise.

A market gardener was telling me within 6 months of the wells going down in N.S.W., his family's potato farm was poisoned. All crops dying and he could set his water on fire.. Yes 6 months !! to lose everything.

This is before we even get to the huge amount of water it takes to just get these wells down.

11-34 million litres for just **ONE** well. Aren't we meant to be reducing and preserving our most precious resource. And these companies don't even pay for that water usage.

There are alternatives to unconventional gas,

There is NO alternative to water.

And the fact we do not even need unconventional gas with all the huge supplies of conventional gas available.

"Here's a thought "maybe keep it in Australia instead of selling it off cheap overseas"

What good is a government if it doesn't listen to it's people.

These numbers say it all. The percentages Against fracking in the surveyed communities

BRUNSWICK	93.9%
NORTH BOYANUP	97.5%
THE VINES	98.8%
CARAMAH	96.8%
GREENHEAD	95.6%
DANDARGAN	96.4%
CHITTERING	99.4%
GREENOUGH	96.2%
EXMOUTH	98.3%
IRVIN RIVER	97.7%
QUEOJINUP	90.7%
STRATHAM	98.7%
CERVANTES	93%
STIRLING	97.8%

That is a huge response to "No we don't want it".

I think it's time to stop looking at the \$\$\$ signs and start looking at a healthy future for our land, water and all Australians.

As my daughter Willow said "If we know it's bad mum, why don't they (meaning the gas companies and government). Or are they just pretending not to know."

mmm The wise words of an 8 yr old.

No. for Year	Magnitude	UTC Date	UTC Time	Sydney Date	Sydney Time	Latitude	Longitude	Approximate location	EVENT ID	ORIGIN ID
2017										
165	5	2017-08-06	04:21:50	2017-08-06	14:21:50	-19.134	128.018	Sturt Creek area, WA. (Reported felt).	1332613	1512732
279	4	2017-04-04	03:55:53	2017-04-04	13:55:53	-25.903	128.939	N of Wingelina, WA. (Reported felt).	1284823	1461413
386	4.2	2017-01-03	15:30:19	2017-01-04	02:30:19	-30.609	118.455	SE of Bonnie Rock, WA. (Reported felt).	1254094	1428866
2016										
34	5.1	2016-11-06	09:54:31	2016-11-06	20:54:31	-19.106	127.987	SE of Hall's Creek, WA. (Reported felt).	1226299	1399009
80	4.2	2016-09-05	16:23:37	2016-09-06	02:23:37	-32.419	122.22	SE of Norseman, WA. (Reported felt).	1201312	1373301
104	4.2	2016-07-31	13:45:49	2016-07-31	23:45:49	-19.124	112.121	Offshore NW Australia, Indian Ocean.	1177006	1347915
117	4	2016-07-16	11:44:49	2016-07-16	21:44:49	-32.501	122.436	SE of Norseman, WA. (Reported felt).	1170326	1340752
122	4.2	2016-07-14	10:08:55	2016-07-14	20:08:55	-32.536	122.433	E of Norseman, WA. (Reported felt).	1169780	1339618
150	5.6	2016-07-08	09:40:50	2016-07-08	19:40:50	-32.458	122.511	E of Norseman, WA. (Reported felt).	1168321	1337714
177	4.4	2016-06-08	02:01:09	2016-06-08	12:01:09	-32.506	122.493	SE of Norseman, WA. (Reported felt).	1155784	1324332
193	5.1	2016-05-28	16:38:44	2016-05-29	02:38:44	-32.46	122.438	SE of Norseman, WA. (Reported felt).	1151183	1319880
194	5	2016-05-28	15:30:26	2016-05-29	01:30:26	-32.497	122.466	SE of Norseman, WA. (Reported felt).	1151148	1319809
201	5.3	2016-05-10	09:44:35	2016-05-10	19:44:35	-16.397	118.69	Offshore NW Australia, Indian Ocean.	1144390	1311851
2015										
16	4.4	2015-10-13	06:54:56	2015-10-13	17:54:56	-22.569	120.751	Pilbara, WA.	1054361	1217974
18	4.5	2015-10-07	20:30:11	2015-10-08	07:30:11	-17.192	121.888	Coastal Broome, Offshore WA.	1052289	1215579
2014										
15	4	2014-11-28	03:01:45	2014-11-28	14:01:45	-26.054	112.569	SW of Carnarvon, WA.	930859	1088297
38	4.5	2014-10-31	19:15:25	2014-11-01	06:15:25	-30.815	121.232	Coolgardie, WA.	917362	1075037
53	4.6	2014-09-26	15:38:16	2014-09-27	01:38:16	-20.1	119.534	Near Port Headland, WA.	902865	1063099
229	4	2014-03-16	03:24:51	2014-03-16	14:24:51	-17.414	124.438	E of Derby, WA.	783669	897012
254	4.6	2014-02-26	00:00:07	2014-02-26	11:00:07	-30.679	121.187	W of Kalgoorlie, WA.	774119	887074

2013										
2012										
33	4	2012-11-28	22:35:22	2012-11-29	09:35:22	-27.757	125.943	SW of Warburton, WA.	583222	683590
2011										
13	5.1	2011-12-05	19:10:00	2011-12-06	06:10:00	-21.514	114.416	NE of Exmouth, WA.	437857	529826
132	4.5	2011-07-14	05:51:36	2011-07-14	15:51:36	-20.865	120.356	NE of Marble Bar, WA.	382674	445458
155	4.5	2011-05-20	20:03:29	2011-05-21	06:03:29	-23.46	119.332	SW of Newman, WA.	360116	421452
166	4	2011-05-07	05:23:36	2011-05-07	15:23:36	-17.735	122.881	NE of Broome, WA.	2734546	2151700
182	5.3	2011-04-17	18:41:20	2011-04-18	04:41:20	-19.803	113.525	North of Exmouth, WA.	345177	405614
2010										
178	5	2010-04-20	00:17:09	2010-04-20	10:17:09	-30.787	121.489	Kalgoorlie, WA.	189501	213827

[REDACTED]

Oral Submission to Fracking Enquiry Dundaragan

2/3/2018

I live in Woodridge situated on the south side of the Moore River Estuary, it is one of a dozen or so small rural residential communities that hug the coast travelling north to Lancelin

To the east of the coastal areas are other rural communities interspersed by small town sites farmland market gardens and agricultural producers which supply Perth and surrounds with essential food.

Residents and businesses in the whole area from the coastal communities in the west and inland to the east lay directly over the Perth Basin Water Resource and are wholly dependent on clean pure fresh ground water drawn from the Perth Basin for their drinking water and all other uses *

Woodridge
Public
Water bore supply
Leederville
Private bores to
shallow.
2
Yarragadee

Perth Basin water resource is extremely vulnerable to contamination, one accident caused by fracking could see the whole system irreparably damaged...

There are NO GUARANTEES, NO INSURANCES provided

Once a bore fails, and science tells us that in time they will all fail there is nothing that can be done to fix it... Nothing....

In WA Groundwater Aquifers provide 90% of the supply of drinking water, Regional Communities are completely without any sustainable alternatives to their current local sources of water



* The WA Water Authority stated there needs to be a complete ban on any extraction of unconventional gas from ANY areas where public and private bores are the only source...

* The Department of Health states "If fracturing is done incorrectly the process has the potential to contaminate surface and underground drinking water sources",,,, (DOH 2013) and it will

* There have always been accidents and there have been Royal Commissions which inevitably follow serious water contamination, Sydney 1998 and Walkaton 2000.

The importance of protecting drinking water sources from contamination was strongly emphasised.

People in Woodridge and surrounding areas are extremely anxious that Fracking will cause our groundwater to be so contaminated that we lose the whole system.

There is the concern in regard to the chemicals that are used in gas extraction and fracture, it is known they are mostly noxious and incompatible with the requirements of the National Health and Medical Research Council for use in Public Drinking Water Supply Areas ...

The public have a right to know what chemicals are proposed for use and to be informed of what risks can occur to the purity of the drinking water ...

We know Methane can be stored in pockets hidden below the surface, with grave risks to human and environmental health if these pockets are punctured and released into the aquifer or brought to the surface in the process of drilling,

Large quantities of our valuable groundwater is used in the process of drilling and this precious water mixed with sand and chemicals can flush back to the surface possibly with added methane or sulphur via the cavity in the dual lining of the well while drilling.

Dams are required for catching this back flow, where does this toxic mixture end up??

If methane is released there is possibility of a FLARE up....

Woodridge is an area of native Banksia woodland with Tuart Eucalyptus and an abundance of Grass Trees..

In the event of bushfire Woodridge is now officially listed as 'Catastrophic'. And maybe the other estates also

One Methane flare could cause widespread destruction and possible fatalities. This is not an exaggeration,

I have lived in Woodridge for almost 20 years and been through one serious bush fire in that period thought to have been caused by a cigarette butt thrown out by a passing motorist on Indian Ocean half my block was burned but fortunately I and my house and animals survived

There is no doubt that fracking for unconventional gas is too risky to be considered over our only ground water source, it puts it at serious risk of serious contamination..

Nobody can predict that incidents of contamination will not occur

But of course you know all of this, and so do we...

I am a mother, a grandmother and a great grandmother of 16 and it sickens me to think they could be left a legacy of neglect by governments and authorities who were trusted to provide what is their absolute right to clean air and clean water

It grieves me to see the loss of native flora and fauna and the heartbreak of those who seek to protect these rights

We are handing over a planet riddled with puncture holes from mining all over its surface, punctures that have and will continue to leak noxious gases into an environment already chocking on Carbon emissions wrecking our climate...

We don't need this gas, we already have renewables capable of sustaining us..

NO GUARANTEES NO INSURANCES...The extraction of unconventional gas should not be undertaken over groundwater sources...

It really does needs to stop NOW