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26 April 2017

Panel
Fracking Inquiry NT
fracking.inquiry@nt.gov.au

Dear Panel;

Re: Inquiry into: Scientific Inquiry into Hydraulic Fracturing in the Northern Territory

The Norwood Resource Incorporated (TNR) is a not for profit organisation registered with the ACNC, and we submit the following to the Panel for its deliberations into the matter of hydraulic fracturing (fracking) in the Northern Territory (NT).

About This Submission

TNR's submission is as follows-

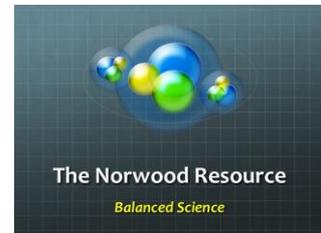
1. This front letter
2. Attachment A – Hydraulic Fracture stimulation in Exploration and Production of Hydrocarbons – A Basic Overview. (TNR Paper, updated 5 February 2015)
3. Attachment B – Do Protestors tell you the truth and are their protests based on Facts?? (TNR Paper, updated 5 February 2015)

The Norwood Resource (TNR) evolved from an informal monthly gathering of retired, semi-retired and independent oil and gas industry professionals who had become increasingly dismayed about the way these industries were being misrepresented in the media. Assertions that these industries impact poorly on the environment come from ill-informed and often untrue statements in the press with scant reference to any facts. The Norwood Resource team has first-hand knowledge about many facets of the oil and gas industries and can assemble, review and provide a definitive assessment of the relevant facts.

As a consequence, The Norwood Resource was formally incorporated as a not-for-profit entity and registered as a charity with the ACNC in September 2013.

Our mission:

1. To assemble and disseminate factual, scientific and verifiable information about the environmental impacts of oil and gas (petroleum) exploration and production to the media and the community at large.
2. To actively challenge and counter misinformation about the impacts of oil and gas (petroleum) exploration and production on the environment.



3. To inform key media personnel about the environmental regulations under which the energy industries operate and the care with which they research and maintain best environmental practices.
4. To establish and maintain a centre of expertise about the oil and gas (petroleum) exploration and production industries and best practice environmental protection knowledge and outcomes.

Web: <http://thenorwoodresource.org.au/>

The Norwood Resource (TNR) has over the last 3 years or so devoted much of its energies to countering misinformation about the impacts of the oil & gas industry on the environment. On our website there are numerous papers in relation to various 'issues' relating to oil & gas exploration and production (E&P).

TNR commends the Panel for its leadership in developing a very comprehensive 'Background and Issues Paper' (Discussion Paper) which sets the scene for which the Panel will be devoting much of its energies on. We also commend the Panel for its determination to visit and hear from the widespread local communities to gain the local social and cultural input which we hope propels the Panel towards balance in its final recommendations.

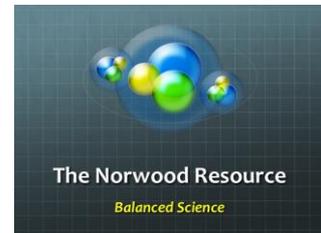
We note that the Discussion Paper covers nine major themes of potential risks to be examined. TNR is not equipped to respond to each and every risk theme identified in the Discussion Paper, and so this submission will concentrate upon the results from credible (non political) past inquiries as a clear indication of the actual level of risks from unconventional gas and oil exploration and the use of fracking to enhance production.

1 Environmental Non Government Organisations (eNGOs)

We have noted over the last few years an increasing number of so called environmental non Government organisations (eNGOs) which seem to pursue their ideological agenda's (which are mainly anti fossil fuel agenda's) through the manufacture, proliferation and dissemination into the mainstream media and social media of misinformation, misrepresentation of facts, myths, half truths, pseudo science, scary stories, manufactured circumstances and incidents as well as lies.

We have in the past examined some of these claims and assertions from eNGOs and their representatives, and found that misrepresentation, misinformation and the manufacture of scary stories to be the order of the day. It appears ethics is not high on their mission statements.

Many of the eNGO's are totally anti fossil fuels (oil & gas and coal). A new society and economy without fossil fuels is just not practical now or into the foreseeable future, as there are no viable alternatives currently in existence, nor sanctioned projects to replace what we have to fuel our economy today. Indeed it would be negligent, irresponsible and criminal to cease using fossil fuels immediately as some of the eNGO's clamour for, as it would immediately condemn to death large portions of our community, since there would be no petrol or diesel for transport (therefore no food for cities), no plastic for computers, mobile phones etc. Many of the aims of these eNGO's which are so vocal are just irresponsible and nonsensical and have no practical application, and yet they manage to collect likeminded minions to follow their 'impossible dreams'.



TNR has reviewed a cross section of these claims and loose assertions manufactured and perpetuated by some of the more vocal eNGOs. Our Attachment B “Do Protestors tell you the truth and are their protests based on Facts?? (TNR Paper, updated 5 February 2015)” cuts to the ethics and morals of some of these eNGOs and their representatives. The continual spreading of misinformation, myths and lies by some eNGOs appears in the social media, and then into mainstream media and then as a consequence, the general public pick up snippets and respond accordingly in that they are against unconventional gas and fracking since it has ‘bad press’ and nothing more, since invariably the facts do not verify the lies and myths, but the damage is done.

TNR requests that The Panel rely upon the facts and the science and allow common sense to prevail in its deliberations.

2 Fracking Paper TNR Attachment A

Attachment A is a outline of the fracking process, however, we note the Discussion Paper also has a comprehensive outline and description of the fracking process. We have included our paper here as it draws upon slightly different credible sources of information, and is included here for completeness.

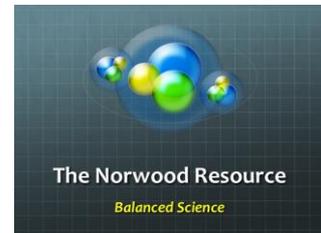
3 Previous Inquiries

There have been many Inquiries on this and similar subjects around the world and in Australia in recent times. Virtually all credible (non political) Inquiries have arrived at similar conclusions, in that exploring for and developing gas and oil from unconventional sources (shale) with the use of hydraulic fracturing (fracking) is unlikely to pose any significant risk (or significant additional risk compared to conventional oil and gas exploration and production) to groundwater (aquifers) or to human health, providing appropriate robust regulations (including environmental aspects) are in place, which are adhered to and enforced, such that the risk is acceptable and as low as reasonably practical (ALARP).

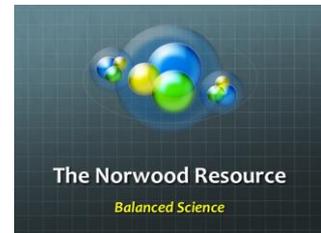
Fracking of wells in the NT is nothing new!, Just as fracking is not a ‘new’ process. Over the last 65 years (since 1949) over 2 million wells have been fracked. Most has occurred in North America. Given this has occurred for over 65 year in the most litigious country on the planet, there has not been floods of lawsuits over this period, and given the anti fracking positions from some so called eNGOs in North America and here in Australia any evidence of such cases would be at the top of their claims as justification for shutting down fracking all together.

As noted in your Discussion Paper, there is a long history of wells being fracked in the NT, all without any significant impact on the environment. Further, as the Panel would have noted on its trip to Moomba over 750 wells have been fracked in the SA portion of the Cooper Basin, again without any significant environmental impact on aquifers, landscape, animal or human health. In fact, in the Cooper Basin area, **a number of cattle stations run their cattle in and around the oil & gas operations, and they have won and still retain accreditation for organically produced beef. This, alone should dismiss any fears about groundwater contamination from fracking operations in the NT.**

There are many previous credible inquiries which the Panel can review, and the following are just a few of what we believe to be the more pertinent ones:



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- A The Discussion Paper refers to (page 11) the previous work undertaken through the Hawke Reports (2014 and 2015) as well as the 2016 Hunter Report. These should be the building base for the current Panel's work.
- B Prior to the Hawke Report 2014 The Australian Council of Learned Academies (ACOLA) Report "Engineering Energy: Unconventional Gas Production A Study of Shale Gas in Australia" 2013, found that with appropriate safeguards in place shale gas (unconventional) with the use of fracking represents no greater risk than conventional gas. Although certain regulatory oversight needs to be maintained and adhered to maintain a risk profile which is acceptable and as low as practical (ALARP).
- C The NSW Chief Scientist and Engineer, Professor Mary O'Kane conducted a review of Coal Seam Gas (CSG) and while we note that CSG is not the subject of the panel's Inquiry, we believe her findings are pertinent to this Panel's deliberations. On page 7 of her Report (30 Sept 2014) "There is a perception in some parts of the community that CSG extraction is potentially more damaging and dangerous than other extractive industries. This perception was heightened following the release of the American movie Gasland in 2010. The Review examined this issue in detail and concluded that while the CSG industry has several aspects that need careful attention, as do almost all industries, it is not significantly more likely to be more damaging or dangerous than other extractive industries". The relevancy is twofold, in that the NSW Chief Scientist and Engineer's Review debunked the hype associated with the movie Gasland, and recognised each extractive industry has its own unique characteristics which must be recognised, managed and regulated appropriately to achieve ALARP.
- D The Western Australian Upper House reviewed the issue of fracking, and after two years of examining evidence etc. concluded that fracking can be carried out safely if regulated appropriately. It found the impact on human health and the environment were 'negligible' despite widespread concerns about the practice.
- E The South Australian (SA) Natural Resources Committee recently completed a two year Inquiry into unconventional gas and the use of fracking, and issued its final Report on 30 November 2016. Its key recommendation against its first Term of Reference was that unconventional gas (fracking) is unlikely to have any impact on groundwater (aquifers).
- F As mentioned, there have been many Inquiries worldwide, but the UK is also very relevant to Australia, as its ownership to mineral rights is similar to Australia. The UK had a very rigorous inquiry carried out by the Royal Society and the Royal Academy of Engineering specifically to do a report on hydraulic fracturing and shale gas. Professor Sir Mark Walport UK Chief Scientist gave a speech predominantly focussed on Risk and Innovation in Germany in September 2014, summed up the findings, with the following
- "There are really 3 science and engineering concerns about hydraulic fracturing (fracking). The first of these is: will it cause earth tremors? The second is: will you get contamination of the water table? And the third is: will there be fugitive release of the methane gas? (In other words if you leak all the gas then you lose the advantage of it as a fossil fuel). And what the science and the engineering tells you is that this is a drilling technology and no drilling technology is completely risk-free. **But if it is done well, if it is engineered well, if it is governed well, then it is as safe as any other form of drilling**, recognising that there is no 'free lunch', there is nothing that is completely risk-free." He went on to note



“Those are the engineering concerns, and that’s what the Royal Academy of Engineers’ report said and actually multiple other reports have all essentially said the same thing. But the public or publics who are protesting, at least in some parts of the world, about fracking are coming at it from a different angle. They’re coming at it from the values angle and from the ‘my pain, your gain’ angle. And so there’s a group that dislike fracking because they dislike fossil fuels, there’s another group that dislike fracking because they actually just don’t like big companies, and then there’s a third group who just don’t want the inconvenience of having something industrial happening in their back yard.” The referenced speech can be found here <http://bit.ly/1CVyur7>

In line with the UK Inquiry and the recommended outcomes, the UK Infrastructure Bill 2014-15, was passed through the UK Parliament, and it, which among other things will permit fracking below 300 meters in the UK.

In Summary

- **Fracking is not new in NT. Just south of the NT fracking has been used over the last 40 years in the Cooper Basin where the local beef producers are producing certified organic beef.**
- **Over 2 million wells have been fracked over the last 60 years or so, most in North America, which is the most litigious area in the world. There has not been any substantiation of activist claims as to widespread environmental damage.**
- **The impact on the land use is negligible when compared to non fracked oil & gas wells.**
- **The impact upon the land use is small compared to agriculture, and is certainly not competing with agriculture for land use.**
- **multiple credible inquiries have returned almost the same assessment of unconventional exploration and the use of fracking, that is, if it is engineered well, done well, and the regulatory regime is also robust then it is no different to any other form of drilling.**

Based upon the foregoing, on balance, providing the regulatory oversight is robust and adhered to, drilling for unconventional gas and oil and the use of fracking in the NT, does not present an increased set of risks compared to any other drilling technique such as conventional wells (or water wells).

TNR requests that The Panel rely upon the facts and the science and allow common sense to prevail in its deliberations to recommend that drilling for unconventional gas and oil and the use of fracking in the NT can be as safe as any other drilling activity, providing the regulatory oversight is robust and adhered to.

Yours sincerely

A handwritten signature in black ink, appearing to read "B. Holland".

Bruce Holland
Secretary
The Norwood Resource



The Norwood Resource

Balanced Science



HYDRAULIC FRACTURE STIMULATION IN EXPLORATION AND PRODUCTION OF HYDROCARBONS

A Basic Overview

There is much information published about the process of hydraulic fracture stimulation (often called ‘fracing’ or ‘fracking’) in scientific journals, industry and regulatory reports, magazines and newspapers, and on the web. Not all of the information contains the facts about the process, its history, its effects or non-effects, risks, and known environmental impacts. Nor does the information necessarily come from scientists, technicians or operators who have first-hand knowledge and field experience of well construction and hydraulic fracture stimulation. However, generally speaking, the best first ports of call for reliable information are the information brochures and publications generated by the relevant regulatory authorities¹, the oil companies and associated industry organisations, government science agencies such as the CSIRO, and universities.

So, what is hydraulic fracture stimulation and why is it done?

Hydraulic fracture stimulation of hydrocarbon reservoir rocks that have a structure and fabric rendering them relatively impermeable to the movement of gas and liquids is undertaken to increase their permeability. The target reservoirs which are particular geological formations, usually at significant depths (typically greater than 1km.) below the landsurface, and under great pressures, are fractured and cracked in such a way that the hydrocarbons (gas and liquids) can migrate from formerly isolated pores to the wellbore and then flow through the well (borehole) to the surface. If there are sufficient hydrocarbons in the reservoir formation, there may be commercial quantities of gas and/or oil recovered on the landsurface at the well-head.

Basically, hydraulic fracture stimulation is the process of generating permeability in the target formation by pumping (injecting), under pressure, water with a proppant (usually sand), which props open the fractures and cracks once they have been generated, and small quantities of chemicals (about 0.5% of the injected fluid) that facilitate the formation of fractures and cracks.

Secondly, how long has hydraulic fracture stimulation been used in the oil industry?

Hydraulic fracture stimulation has been used around the world for the last 65 years or so in more than 2 million oil wells to facilitate the release of hydrocarbons from relatively impermeable reservoir formations. The technology has naturally changed and developed

¹ Since we are located in South Australia, and we currently have a really good source of information from the regulatory compliance group in the Petroleum Division of The Department for Manufacturing, Industry, Trade, Resources and Energy (DMITRE), and there is very good information (see Link 1 the Chapter 11 FAQ's) on its website.

significantly since the process was initiated (in response to declining production from formerly productive hydrocarbon reservoirs and formations). The process and its effects are continually managed, modified and improved, and monitored by the industry and its contractors and consultants, and widely scrutinised by the regulatory authorities. The outcomes, by and large, have been more focussed and effective exploration programs for hydrocarbon gases and liquids, increased production of hydrocarbons, and a low risk to the subsurface and surface environments.

It's of note that hydraulic fracture stimulation is one of the important processes used in developing geothermal energy from hot rocks at depth in the earth's crust in Australia and elsewhere. Here it facilitates the movement of water through the hot rocks between the injection and recovery wells and the generation of steam for power production.

What's the history of hydraulic fracture stimulation in South Australia?

The hydraulic fracture stimulation process has been used for over 40 years to facilitate oil and gas extraction from geological formations in the deeper parts of the Cooper Basin in South Australia. There have been more than 2000 wells drilled for hydrocarbons and, since around 1970, over 700 of these have been hydraulic fracture stimulated. Unlike coal seams from which gas is extracted in eastern Australia, the primary use of hydraulic fracture stimulation in South Australia, Western Australia and Victoria has been in deep geological formations (not coal seams) 1.5 to 5 km below the surface.

What are the benefits of hydraulic fracture stimulation?

Hydraulic fracture stimulation techniques have enabled the industry world-wide to extract more gas and oil from wells than would otherwise have been possible. The average cost of production of hydrocarbons is correspondingly less than it would otherwise have been. The result is lower petrol and diesel prices, lower costs of gas for homes and businesses, and lower electricity prices for communities.

Increased production from wells, particularly as one well pad can be used for multiple wells using directional and/or horizontal drilling techniques. The industry is making use of "S" shaped drilling techniques, whereby a well bore from a well pad is deviated away from the well pad and then brought back to the vertical direction once it enters the target hydrocarbon bearing formation. This technique enables multiple wells to be drilled from the same pad and develop a much larger area 1000's of meters below the surface in the target reservoir formation. This actually means a smaller number of wells are required to meet production targets and there is correspondingly less competition for land use and less impact and disturbance on the land surface environment.

What about impacts on subsurface and surface environments?

The widely available literature, including social media and scientific discussions on professional websites such as ResearchGate and LinkedIn, however, a note of caution should be mentioned as not all sites address valid concerns, nor reference the full factual evidence about hydraulic fracturing or fracking. Some of the genuine concerns about the possible impacts of hydraulic fracture stimulation include:

- compromised integrity of well bores that could enable hydrocarbons or the components of fracturing fluids to leak out into groundwater aquifers that supply communities with water, or even degrade the quality of surface waters;
- the potential for initiation of earthquakes or other forms of seismic activity which could compromise the integrity of the hydrocarbon well, disturb or degrade groundwater aquifers, or cause destruction at the landsurface; and
- land use competition, particularly in prime agricultural areas and in or near populated community environments.

What can be verified about the complex issue of hydraulic fracture stimulation?

A. Integrity of the well bore

- Exploration and production wells are drilled from the landsurface to considerable depth (1.5 to 5 km below the surface) through rock layers to access the target formation containing hydrocarbons. The drillhole traverses a variety of materials, including soil and weathered rock near the landsurface, consolidated rock layers at greater depths, and one or more zones in which groundwaters are concentrated (aquifers). Drilling is carried out in such a way that the soil and rock materials, as well as water, in these various horizons are not mixed nor allowed to leak into the borehole.
- Wide-ranging discussions by technical and scientific specialists on ResearchGate indicate that the drilling of a well and hydraulic fracture stimulation ('completion' of the well) are two independent techniques usually carried out at different times and by different technical specialist teams. Properly constructed wells ensure that the materials traversed by the drillhole (wellbore) are sealed off from one another and the drillhole by cements or grouts that bond the rock wall to the casing pipe. The usually great depth of the target formation is also a barrier to prevent hydrocarbons and fracture stimulation fluids 'leaking upwards' toward the surface.
- Drilling and hydraulic fracture stimulation techniques have been developed over many years by specialised companies to ensure that any risks of a breach (leak) in the integrity of boreholes are minimised. Control techniques include monitoring systems and 'fail safe' sensors to ensure that pressure limits are not exceeded during fracture stimulation. Each well is constructed of an assembly of steel pipes in concentric arrangement, together with cement and grout bondings, which isolate the hydrocarbon production system from the geological and hydrological formations through which it passes. Any compromise of the integrity of the well is detected

through its monitoring and shutdown systems. Potential loss of production and regulatory oversight are a strong motivation for the E&P companies to ensure that wells are constructed and operated to the highest standards.

- There have been reports of gas (methane) in groundwater flowing from taps in some regions overseas and this has been ascribed to contamination from fracture stimulation in nearby oil wells. However, methane does occur naturally in groundwater in some localities, especially in hydrocarbon-rich regions. Hydrocarbons can also seep naturally from deep sources to the land surface (over millennia), and this is widely recognised². Neither of these processes involves hydraulic fracture stimulation. It is difficult for fracture stimulation fluids to contaminate aquifers because gravity stops them migrating from shale gas reservoir depths, and they would have to travel up through tightly compressed strata many hundreds (or thousands) of meters to reach an aquifer.
- Prior to undertaking any drilling, all E&P companies undertake detailed studies of the subsurface geology and hydrogeology of the regions in which they may construct exploration and/or production wells. It's sound economics to be sure of the challenges and costs before committing large sums of money in E&P. Data would normally include characteristics of the rock strata and the development and distribution of groundwater aquifers, seismic data to reveal conductive and non-conductive faults and fractures, permeability, porosity and poroelasticity of the strata, and so on.

B. Earthquakes and seismic activity induced by fracture stimulation.

- There is extensive scientific literature on this subject. Small-scale seismic activity is common around surface and underground mines, and is also known in areas where hydraulic fracture stimulation has taken place, as well as in areas of oil extraction, groundwater extraction, and geothermal energy production. The vast majority of these 'induced earthquakes' (small tremors) are too small to cause any damage³. It appears from the scientific studies that the energy required to generate an earthquake capable of causing damage cannot be generated by the abovementioned activities. However, the detailed geological investigations that are a necessary component of the exploration for shale gas and oil ought to indicate faults and fractures in or near the target horizon that might constitute sites of potential failure under hydraulic fracture stimulation.
- There are reports of minor seismic activity following several hydraulic fracture stimulations in northern UK. Their impact (seismic activity at around 2 to 3 on the

² Asphaltites such as Coorongite are local examples.

³ Dr M Palano, National Institute of Geophysics & Volcanology, Etna Observatory, Italy. ResearchGate discussion, July 2013.

Richter scale) was assessed by the respective authorities to be low to minor, non-intrusive, and of no particular threat. The hydraulic fracture stimulation was undertaken in an area previously known for active seismic activity, and as an outcome of the investigation by the regulatory authorities drilling and hydraulic fracture stimulation was allowed to continue.

C. Concern about the chemicals used in fracture stimulation.

- Chemicals in fracture stimulation fluids⁴ constitute about 0.5% of the material injected. The rest is water and proppant (being usually sand). The chemicals include acid (the same as used in swimming pools), surfactant (isopropanol) used in glass cleaners, antiperspirants and hair colour, friction reducers (used in hair, makeup and skin products), guar gum thickener (used in icecream, baked goods, toothpaste, sauces and salad dressings), and potassium chloride clay stabiliser (used as a salt substitute in low sodium diets).
- The chemicals are used to assist in generating the cracks and fractures in the target formation, and moving the proppant into the fractures to prop them open when the pressure is released.
- According to Dr Jeremy Boak (Colorado School of Mines, August 2013) no documented case of contamination of groundwater from fracture stimulation chemicals in Pennsylvania has withstood technical scrutiny to date.

D. Treatment and handling of contaminated 'process water'.

- Hydraulic fracture stimulation can generate large quantities of contaminated water at the well head (used and often recycled as part of the fracking process). It contains the chemicals used in the hydraulic fracture stimulation process as well as hydrocarbon residues from the target formation and possibly salts from deep groundwater. From the environmental perspective, this 'process' water has to be carefully contained and processed before release or use in the surface environment. The challenge of dealing with contaminated waters in the surface environment is faced by all mining companies and many industrial companies and is strongly regulated.

E. Land Use competition

- There is also much discussion and concern about the disturbance generated by Exploration and Production (E&P) companies as they establish surface infrastructure and thus interfere with, and even degrade, strongly held values of agricultural and horticultural land areas.

⁴ Dr J Boak, Colorado School of Mines, USA (ResearchGate discussion, August 2013)

- Early engagement and active communication and transparency about the activities, historical performance and reputation of the E&P entity, the process and potential impact on the land surface and existing infrastructure, and the potential partnership arrangements with the local community, are vital strategies that have the best chance of leading to cooperation between the parties.
- Coupled with a robust regulatory regime (which SA is blessed with), which has transparent regulations and a well resourced and managed regulatory oversight to ensure best industry practice of drilling operations, which includes well design, drilling operations and compliance.
- Of special note in South Australia, in the North of the State (Cooper Basin), where over 2000 wells have been drilled, of which about 700 have been fracked, there are numerous cattle stations (farms). A number of these cattle stations run their cattle within the vicinity of the oil & gas operations, and have been awarded organic beef certification. During this time (over 40 years of operations of oil & gas exploration, fracking and production) there has not been any issues about both industries co-existing within the same locality.
- In the South-East of SA, over the last 30 years approximately 120 wells have been drilled, but not fracked. Similarly to the experience in the North of the State, agriculture and the oil & gas industry have happily co-existed during this time.
- If those or new wells in the South-East are fracked, the footprint of land use by the oil & gas operations will be similar to what it is now. In summary there is no reason as to why the industries cannot happily co-exist in the future.

CONCLUDING REMARKS

It is worthwhile adding a reference to the UK experience with its rigorous inquiry into fracking by the Royal Society and the Royal Academy of Engineering specifically to do a report on hydraulic fracturing and shale gas. Professor Sir Mark Walport UK Chief Scientist gave a speech predominantly focussed on Risk and Innovation in Germany in September 2014. In reference to fracking he stated

“There are really 3 science and engineering concerns about hydraulic fracturing (fracking). The first of these is: will it cause earth tremors? The second is: will you get contamination of the water table? And the third is: will there be fugitive release of the methane gas? (In other words if you leak all the gas then you lose the advantage of it as a fossil fuel). And what the science and the engineering tells you is that this is a drilling technology and no drilling technology is completely risk-free. But if it is done well, if it is engineered well, if it is governed well, then it is as safe as any other form of drilling, recognising that there is no ‘free lunch’, there is nothing that is completely risk-free.”

In summary, in South Australia we have the tools and the knowledge and experience base for fracking to be carried out without undue concerns regarding risk.

To do a check list as set out above by Professor Sir Mark Walport,

- Is it engineered well? – the response has to be **Yes**, since the Operators are very well experienced and the current Regulator does not issue licences to poor operators, the Regulator applies a rigorous process for Licencing and Approvals for exploration (including Environmental Assessment and Approval of Environmental Objectives), retention and production activities. The Regulator also applies a Risk assessment to achieve a risk level to conform with As Low As Reasonably Practicable (ALARP).
- Is it governed well? – the response has to be a resounding **Yes** for SA. The Regulatory regime in SA is robust through the PEGA Legislation, which to date some 700 wells have been fracked without incident.
- Will it be done well? – the response again is **Yes**, as the Operators which ‘pass muster’ within SA must get a licence and as stated above the SA Regulator is experienced and knowledgeable in fracking, having already overseen 700 fracks in the State. Further, the Operators operating in the South-East to date have been very experienced and to date, have carried out their operations diligently and comply with the PGEA.

Then on balance, drilling and fracking in the South-East of SA is as safe as any other form of drilling.

Bruce Holland

Secretary

The Norwood Resource

Sources of information & further reading

1. South Australian regulator (DMITRE)

http://www.pir.sa.gov.au/__data/assets/pdf_file/0004/178357/Chapter_11.pdf

2. AJ Lucas involved in shale oil and gas exploration in England. Annual report re fracking:

<http://www.lucas.com.au/lucas2013onlinereport/fracking-conversation/>

3. Royal Society report on fracking in the UK

Independent report by the Royal Society and Institute of Engineers in the UK re shale gas production and fracking.

<http://royalsociety.org/policy/projects/shale-gas-extraction/report/>

4. Cuadrilla Resources - operator in jv with AJ Lucas in the UK re Fracking

<http://www.cuadrillaresources.com/what-we-do/hydraulic-fracturing/>

5. Cuadrilla re fracking:

The operator of the joint venture which caused the two minor earthquakes near Blackpool.

<http://www.cuadrillaresources.com/news/cuadrilla-news/article/geomechanical-study-of-bowland-shale-seismicity/>

6. British Geological Survey

Report after the two earthquakes detected near Blackpool.

http://earthquakes.bgs.ac.uk/research/earthquake_hazard_shale_gas.html

7. Australian Council of Learned Academies (ACOLA) “Engineering Energy: Unconventional Gas Production A Study of Shale Gas in Australia” Final Report.

<http://www.appea.com.au/wp-content/uploads/2013/07/ACOLA-Final-Report-Engineering-Energy-June-2013.pdf>

8. National Research Council. “Development of Unconventional Hydrocarbon Resources in the Appalachian Basin: Workshop Summary”. Washington, DC: The National Academies Press, 2014

Contains a lot of basic information on shale gas production.

http://www.nap.edu/catalog.php?record_id=18624

Do Protestors tell You the truth and are their protests based on Facts??

Many environmental non-government organizations (eNGO's) exist based on half truths, misinformation and erroneous interpretations of selected bits of fact, to basically create a scary story. This scary story is then packaged into short catch cries and pedaled through social media and the public to elicit a media presence and general support, mainly in the pursuit of funds and publicity.

Some of the eNGO's, while masquerading as deeply concerned organizations have either been hijacked away from their core purpose and/or become part of a wider campaign to stop all fossil fuels (petroleum products and coal) in their pursuit of climate change.

These are the very industries that create employment and create products that all of us and these very organizations and their vocal representatives, use every day such as petrol for cars, jet fuel for their plane travel, plastic for a multitude of products such as computers, mobile phones, etc, copper for the water supply and so on.

To get a feel as to how extensive oil & gas products are used in our everyday lives, review the following links. <http://bit.ly/1LHHZ1b> and <http://bit.ly/18JXWoo>

We and our society depends upon these products, they enable us to live through the transport of food to our cities, to provide our energy to keep us warm in winter, keep us cool in summer, transport our ourselves and families and to maintain our standard of living.

However, there are vocal anti development (anti fossil fuels – petroleum products) groups hiding behind the issue of climate change to keep some of these products in the ground. However, they tend to forget that even renewable energy needs vast amounts of resources dug out of the ground (eg. coal and iron ore for steel pylons, rare earths, and other metals for components). They tend to use pseudoscience, misrepresent the risks (they often confuse risk with hazard) and create scary stories. Life and everything we do is not risk free, but we balance the risk with the likelihood of something bad happening, such as driving our cars, taking an air flight etc.

There are some eNGO's (and their vocal representatives) who continue to ignore evidenced based facts about the impact of oil & gas exploration upon the environment and deliberately mislead unsuspecting media, their 'supporters' and the general public. Some eNGO's and their vocal representatives are simply duplicitous. Basically they cannot be trusted to convey the full facts to the media or public.

It is worth noting that the UK Chief Scientist, Professor Sir Mark Walport in a speech in September 2014 when talking about Risk, he included comments on fracking as well as protestors as follows, on fracking he made the following comments,

"There are really 3 science and engineering concerns about hydraulic fracturing (fracking). The first of these is: will it cause earth tremors? The second is: will you get contamination of the water table? And the third is: will there be fugitive release of the methane gas? (In other words if you leak all the gas then you lose the advantage of it as a fossil fuel). And what the science and the engineering tells you is that this is a drilling technology and no drilling technology is completely risk-free. But if it is done

well, if it is engineered well, if it is governed well, then it is as safe as any other form of drilling, recognising that there is no 'free lunch', there is nothing that is completely risk-free." And on protestors he made the following comments, "Those are the engineering concerns, and that's what the Royal Academy of Engineers' report said and actually multiple other reports have all essentially said the same thing. But the public or publics who are protesting, at least in some parts of the world, about fracking are coming at it from a different angle. They're coming at it from the values angle and from the 'my pain, your gain' angle. And so there's a group that dislike fracking because they dislike fossil fuels, there's another group that dislike fracking because they actually just don't like big companies, and then there's a third group who just don't want the inconvenience of having something industrial happening in their back yard." The referenced speech can be found here <http://bit.ly/1CVyur7>

Turning to the above question, 'Do Protestors tell You the truth and are their protests based on Facts??' let's look at some examples over the last little while.

Example 1

On or about the 7th/ 8th of January 2015, a gas well (Yulleroo #2) which is located near Broome (WA) was the subject of an on line video by local eNGO's such as the anti fracking group 'Broome Community No Gas Campaign'. The film was also tweeted and shared with anti fracking eNGO sites across Australia, including Lock The Gate which tweeted the film of the well. So there was a lot of exposure.

The Yulleroo #2 well was fracked a couple of years ago, it is not producing any gas and was made safe by the Operator, including installing a mesh fence on its perimeter.

The film shows a hand held gas detector showing very high levels of methane leaking from a valve. Of course, this was news and was also picked up by the media, and news reports.

However, subsequently, upon investigation by the company concerned and the relevant Mines and Petroleum authorities it was revealed that **the valve on the wellhead had been deliberately bent and manipulated to allow gas to leak**

Any apology from the eNGO's? No way! and of course (at the time of writing), the 'leaky valve' incident is still able to be seen on these eNGO's sites. to show the viewing public 'proof' that fracking is not safe, despite the valve stem being deliberately bent and the valve needed to be manipulated to have a leak.

The valve has since been replaced and is in the custody of The WA Department of Mines and Petroleum, and the area has been inspected by police and the break in of the enclosure, the deliberate damage and the filming (which was highly dangerous, as the intruder could have blown themselves (and anyone else in the area) up) is being investigated by the WA Police.

Here, we have a deliberate criminal act (the break in and the willful damage to private property) as well as a risky act, **to manufacture 'evidence'** and then try to gain maximum exposure publicly which is just fraudulent! Along without any contrition by those eNGO's which posted it and continue to enable viewers to see it.

Example 2 – Hydraulic fracture stimulation (fracking)

Recent social media posts by activists, such as Anti CSG, and Anti Fracking groups (such as Lock the Gate and various spin offs from this activist group), which have sprung up

primarily in country areas over the last three years or so.

They use “quotes” from eminent people and organizations to package a ‘potentially dangerous risk’ of say fracking into a slogan or sound bite for media use. This includes routinely extracting corroborating articles and misinformation generated by associated or likeminded activist groups, so there is a constant stream of scare stories. One prime example is the scandalous use of the eminent use of the UK Chief Scientist name by Mr Laird from Lock the Gate organization, as reported in the online media “InDaily” in early December 2014.

In regard to oil & gas exploration and fracking, InDaily reported Mr Laird as saying the following, “Laird cited concerns raised by the Chief Scientist of the United Kingdom, Mark Walport, that fracking held risks similar to those posed by [thalidomide, tobacco and asbestos](#), a [report](#) by the Chief Scientist of New South Wales and a Southern Cross University [study](#) as evidence that farmers’ concerns are backed by science.”

Really? Concerns expressed by highly respected people and researchers who (among other things) say that fracking held similar risks to those posed by thalidomide, tobacco and asbestos? Really?, well let’s look at the facts and evidence which may substantiate such claims from Lock the Gate.

Basically, all of these references used by Mr. Laird from Lock the Gate to support its position are misleading and false, as will be demonstrated below. However it does show the tactics employed by these and similar organizations to misrepresent the facts to spread fear and anxiety within our communities, particularly as we have seen recently in the South-East of SA.

In response to the concerns raised by Phil Laird (Coordinator for Lock The Gate) in referencing the report by The Government Chief Scientist of the UK, in his publication ‘Innovation: Managing Risk, Not Avoiding It ‘ Evidence and Case Studies’, the section Mr Laird quotes **was not written** by the Chief Scientist, Professor Sir Mark Walport, but was actually written **by one of the very many guest contributors. Professor Andy Stirling** from the University of Sussex. In his CV, Professor Stirling is/was (among other things) an activist and a past **Board Member of International Greenpeace and Greenpeace UK**. Further, **Professor Stirling did not say that “fracking” held similar risks to those posed by thalidomide, tobacco and asbestos at all!** Rather he postulated that “innovations reinforcing fossil fuel strategies – such as hydraulic fracturing- arguably offer a contemporary prospective example” (page 51). See <http://bit.ly/1z7JfRp>

Indeed, in the Foreword of the publication, Professor Sir Mark Walport, says, “The chapters and case studies *represent the author’s personal views rather than those of the Government Office for Science...*”. Basically Lock the Gate spokespersons are attributing quotes to and (it would appear intentionally) misrepresenting the words of The Chief Scientist of the United Kingdom. By strange co-incidence another guest author (Robert Muir, University of Cambridge) **supports fracking** in the UK, he writes

on page 82 of the same publication, **“Fracking can be done safely in the United Kingdom, but not without effective regulation, careful management, robust environmental risk assessments and rigorous monitoring.”** - How convenient Lock the Gate forgot to mention this quote!

Further, in the second reference Mr Laird referred to was the NSW Chief Scientist and Engineers (Professor Mary O’Kane) recent report (30 September 2014), which was more focussed on CSG than hydraulic fracturing. On page 7 of the report the Chief Scientist states **“There is a perception in some parts of the community that CSG extraction is potentially more damaging and dangerous than other extractive industries. This perception was heightened following the release of the American movie Gasland in 2010. The Review examined this issue in detail and concluded that while the CSG industry has several aspects that need careful attention, as do almost all industries, it is not significantly more likely to be more damaging or dangerous than other extractive industries”** This statement alone debunks the outrageous anti CSG claims put forward by Mr Laird in regard to the second reference as a reason not to proceed with CSG or fracking. **Basically Lock the Gate have ‘shot themselves in the foot’** so to speak.

Further, in the article Mr Laird uses a third reference about researchers from the Southern Cross University undertaking mobile methane readings around ‘CSG’ fields. This ‘study’ has been labelled as not being in any way conclusive by the researchers themselves! as stated by one of the researchers (Dr. Santos) was quoted as saying **“Any geological area that has gas deposits is going to have natural seeps. At this stage we are unable to separate the contribution of CSG activities from natural seeps because no sampling was done in Tara prior to mining”**. As a consequence, **this reference** to support an anti fracking (or CSG) position **is false and not relevant** to Mr Laird’s position of opposing CSG or hydraulic fracture stimulation (fracking).

To summarise, Professor Sir Mark Walport UK Government Chief Science Advisor **DID Not say anything about thalidomide, tobacco and asbestos in relation to fracking in his report**. This is a mis representation and a falsehood to attribute this reference to him. What he did say about fracking in his speech dated 19 September 2014, delivered in Hanover, Germany, which focussed on Risk, Innovation, Regulation (among other things). Under the heading **“Policy Lenses”** was;

“There are really 3 science and engineering concerns about hydraulic fracturing (fracking). The first of these is: will it cause earth tremors? The second is: will you get contamination of the water table? And the third is: will there be fugitive release of the methane gas? (In other words if you leak all the gas then you lose the advantage of it as a fossil fuel). And what the science and the engineering tells you is that this is a drilling technology and no drilling technology is completely risk-free. But if it is done

well, if it is engineered well, if it is governed well, then it is as safe as any other form of drilling. Recognising that there is no 'free lunch'. there is nothing that is, completely risk-free."

The referenced speech can be found here <http://bit.ly/1CVyur7>

Example 3

A classic example of duplicity is the 2010 film 'Gaslands' which to some extent was a catalyst for the anti fracking activists has been exposed as a deliberate fraud by a concerned rural Mum, which can be seen at the following link: <http://www.truthlandmovie.com/> In this, she shows that naturally occurring gas is contained in the water from household taps despite there being no drilling for oil and gas within anywhere near the locality.

Further, the NSW Chief Scientist and Engineers Report, mentioned above, specifically referenced the film Gaslands, and after review of this and the many claims and assertions from Lock The Gate and similar eNGO's found "“There is a perception in some parts of the community that CSG extraction is potentially more damaging and dangerous than other extractive industries. This perception was heightened following the release of the American movie Gasland in 2010. The Review examined this issue in detail and concluded that while the CSG industry has several aspects that need careful attention, as do almost all industries, it is not significantly more likely to be more damaging or dangerous than other extractive industries”

Basically, the sensationalist film Gasland has been shown to be what it always was – just a movie without any foundation, just like Hollywood movies!

Example 4

Another prime example has been the much publicized 'Bentley Blockade' (at Bentley NSW), where protestors set up camp, built bunkers and spike roads to a farmers property all in the name of 'No CSG' (No to Coal Seam Gas). The operator was Metgasco, which had authorization and licences granted by the NSW Government to undertake drilling for deep hydrocarbons (about 4 km deep) in a disused quarry on a farm. There was no drilling for CSG, nor any hydraulic fracture stimulation authorized or planned for this exploration well, and yet, aided and abetted by a Sydney radio personality, Alan Jones, a well organized and prolonged 'No CSG' and 'Frack Off' campaign continued, despite no CSG or "fracking" was to take place!

Furthermore, the facts and the science about CSG and "fracking" were totally distorted by the activists.

NSW imports 95% of its gas and the price is going up due to an increasing demand (LNG exports) and a shortage of supply options, as well as the tight controls upon exploration the NSW Government has now put in place following the recommendations in the NSW Chief Scientist and Engineers Report.

Unfortunately for NSW residents and businesses, which depend on natural gas, there are further price increases to come on top of the 18% increase approved by IPART in mid 2014, unless gas supply increases. Normal business is under threat! In addition, not only will the price go up, the risk of spills as a result of transportation of oil and gas, is actually greater than exploration and development!

Example 5

Another recent example is in South Australia. In the SE of the State, Beach Energy has drilled two deep exploration wells (deeper than 4km.). However, as soon as the a drilling rig was positioned on its drill pad on a private farm with the owners agreement, out came the anti protestors trotting out all sorts of myths and catch cries (No CSG, Frack Off and so on).

The claimed issues, as in the case of the 'Bentley Blockade' centre on the perceived risk (which is very low) of contamination of groundwater and competition for land use. In regard to the competition for land use, mining in Australia covers approximately 0.02% (1400 sq. km) of the land, whereas Agriculture (excluding pastoral leases) covers 4.6% (45,000sq.km) **in South Australia alone**. See <http://bit.ly/1CVzuLY>
On a comparison basis, mining and petroleum are hardly pushing farmers off their land.

There is no doubt water that is uncontaminated is essential to all communities, but what are the facts here?

In rural communities in the South-East where water is also used for agriculture and farming there are existing contaminants within the water systems, from salinity to pesticides.

In the South Eastern portion of South Australia, where Beach Energy undertook the drilling of two deep wells (more than 4 km deep) there are two primary aquifers, an upper uncontained aquifer in some areas close to the surface, and a deeper (50m to 300m deep) which is contained (ie it has an impermeable layer above it). The (uncontained) aquifer closer to surface is the one normally used by communities. However, there is already contamination of this aquifer predominantly from agriculture and farming . The contaminants are:

- Salinity
- Nitrates (fertilizers etc)
- Pesticides (spraying for pests etc)
- Associated risks from existing and continuing agriculture activities
- Dairying
- Septic waste.

See <http://bit.ly/1HS5WU6>

While the EPA is monitoring and has brought in more stringent regulations than existed in the past, there is a continuing evidence of diffuse occurrences of the contaminants listed above plus others. Further, any oil & gas drilling operations are subject to these (and more) stringent regulations for water use and disposal.

What is the impact of oil & gas exploration in the SE of South Australia in comparison?

The petroleum exploration wells that were drilled in the Penola area by Beach Energy, and the proposed well by Metgasco, were to drill through the respective aquifers. The respective aquifers are isolated from the well bore (production casing) by two to three

sets of impermeable steel (each approx 8 to 12 mm thick) as well as bonded concrete.

The risk that there is any leakage from the well bore to the aquifers is low to negligible. The CSIRO, in its fact sheet has this same view.

See <http://bit.ly/1CVzRWO> and

[file:///C:/Documents%20and%20Settings/Bruce%20Holland/My%20Documents/Downloads/csg-predicting-impacts%20\(1\).pdf](file:///C:/Documents%20and%20Settings/Bruce%20Holland/My%20Documents/Downloads/csg-predicting-impacts%20(1).pdf)

Example 6

Wilderness Society campaign to have shareholders vote for Santos Limited to withdraw from the Pilliga State forest in North Western NSW, aimed to stop oil & gas exploration and production, the very products that enabled them to travel to Adelaide to hold their protest. They are anti development, yet they enjoy the benefits of the development.

A very factual and scientifically based response to the claims made by these groups can be found on Santos' website starting at p27 at the following link: <http://bit.ly/1D95LzF>

The key issue claimed by Wilderness, the impacts on water, was addressed as follows:

- Water use: The community use is 410 gegalitres per annum whereas Santos' use would be 1.5 gegalitres pa. That is, less than 1% of total usage.
- Impact on Aquifers: Modeling and surface testing has demonstrated excellent understanding of the aquifers which has provided good baseline data to check that Santos' operations have no unexpected effects
- Protection of aquifers from contamination: Multiple fail-safe protective measures are described in the document.

Any reader who is interested in this issue will realize, as a result of reading through Santos' response to the "shareholder resolution", that the resolution was flawed and not based on the facts and science.

However, The Wilderness Society claimed their campaign to have Santos withdraw from the Pilliga State forest in North Western NSW was for the potential (as they perceived it) threat to groundwater, whereas this eNGO has an overarching objective **to stop all fossil fuel exploration and development.**

This demonstrates how some eNGO's masquerade behind a local concern to gain support for its ideological objectives.

Example 7

This example was highlighted by APPEA in mid 2014 when they exposed the fact that a petition on the Care2 website asked the community to support a “Western Australia: place a moratorium on gas fracking”.

Care2 not only misled people by saying the activities would be in the “stunning Kimberley region” (**they would not be** – they would be in the desert to the SW of the Kimberley’s) they even further misled the public by including a photo of the Arizona’s iconic Horseshoe Bend on the Colorado River (last time we checked, the Colorado River was not in the Kimberley Ranges!!).



Western Australia: place a moratorium on gas fracking

author: Georgina B
target: Environment Minister, Albert Jacobs
signatures: 40,544



we've got 40,544 signatures, help us get to 41,000

The Western Australia government has allowed fracking to go ahead in the stunning Kimberley region without an Environmental Protection Authority assessment (EPA).

However, conservation groups are outraged and have renewed their call for a moratorium on

Sign Petition!

Prefix: First Name Last Name
 don't display my name
Email
United States
Street Address City
State Zip
(optional)
For more impact, add a personal comment here

sign now

share my signature on Facebook

By signing, you accept Care2's Terms of Service
Your email and postal address will remain private

Having problems signing this? [Let us know.](#)

Again we have eNGO’s misrepresenting the facts to foster a scare campaign, and a complete falsehood by NOT using, or referencing the FACTS.

So in answer to the question, **Do Protestors tell You the truth and are their protests based on Facts ???** - Well based upon the above, the answer is a resounding **NO, and NO!** to both questions

In conclusion, it is highly likely that special interest activist groups will always misinform, mislead, and perhaps even lie, to gain the attention of the community. Those people who really care should be on the lookout for this. After all, unlike businesses or business leaders, not-for-profit organisations and charities are not, for some peculiar reason, subject to laws such as “**truth in advertising**”. Thus, it appears that “anything goes” in pursuit of publicity and the donor dollar!

Attachment B - The Norwood Resource - Updated 4 February 2015

Do Protestors tell You the truth and are their protests based on Facts??

The Norwood Resource (TNR) supports the move to force eNGO's and the like (which includes TNR itself) to comply with the same laws that business in Australia are lawfully compelled to adhere to in relation to "truth in advertising'.

Bruce Holland

Secretary

The Norwood Resource

4 February 2015