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PO Box 235
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6 February 2015

Executive Officer
Natural Resources Committee
GPO Box 572
Adelaide. SA 5001
patrick.dupont@parliament.sa.gov

Dear Committee;

Re: Inquiry into: Unconventional Gas (Fracking)

The Norwood Resource Incorporated (TNR) is a not for profit charity registered with the ACNC, and we submit the following to the Committee for its deliberations into the matter of Unconventional Gas (Fracking) in relation to the potential risks and impacts of hydraulic fracture stimulation to produce gas in the South-East of South Australia.

About This Submission

TNR's submission is as follows-

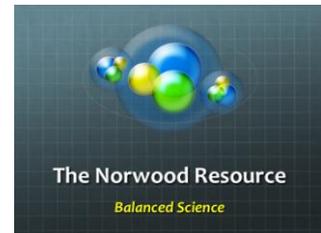
1. This front letter
2. Attachment A – Hydraulic Fracture stimulation in Exploration and Production of Hydrocarbons – A Basic Overview. (TNR Paper, updated 5 February 2015)
3. Attachment B – Do Protestors tell you the truth and are their protests based on Facts?? (TNR Paper, updated 5 February 2015)

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 formed as an informal not-for-profit organisation in late 2012 and formally incorporated as a not-for-profit entity in August 2013, 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 18 months or so devoted much of its energies to countering misinformation about the impacts of the oil & gas industry on the environment. On our website (referenced above) there are numerous papers in relation to various 'issues' relating to oil & gas exploration and production (E&P).

We have noted during this time that there are numerous so called environmental non government organisations (eNGO's) which seem to pursue their agenda's through the manufacture, proliferation and dissemination into the mainstream media and social media of misinformation, myths, half truths, pseudo science, scary stories, manufactured circumstances and incidents as well as lies.

The results are a heightened concern among the activists which permates to the general public, which leads to eNGO's and their followers to question; Is every step of a process safe? Is it regulated properly? Can we trust the Regulator? We can't trust the company! Nor the process! We can't trust the Government! and so we can't trust the Regulator! **It's a conspiracy!** So we don't trust anyone! Whatever it is, we better not do it – ever! Which of course is just a ridiculous outcome if the facts and evidence are not considered.

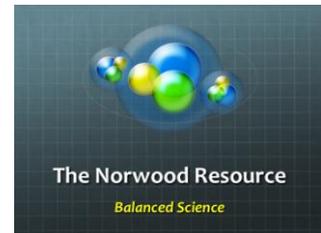
The real issue here is the fallacious arguments and proposed positions (ban all fossil fuel (oil & gas and coal) put by the eNGO's !

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

Many enquiries into various aspects of hydraulic fracture stimulation (fracking) have been undertaken around the world in various jurisdictions, with many volumes of submissions and evidence. The net outcome has been that the practice of hydraulic fracture stimulation is essentially approved for operations since the risks involved are relatively small compared to other associated process of drilling and production from hydrocarbon wells.

Fracking of wells in South Australia 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, in facts none that have been reported, and given the anti fracking positions from some so called environmental non Government organisations (eNGO's) in North America and here in Australia and the South-East of the State any evidence of such cases would be at the top of their claims as justification for shutting down fracking all together.

In relation to drilling operations for wells, it should be noted by the Committee that in the South-East there have been around 120 oil & gas wells drilled, and there has been gas production in the South-East for the last 20 years (at Katnook) or so. All of these activities have occurred over this time without any protests or controversy of note. So what's the difference now? fracking



which has been proven safe around the world for the last 60 or so years and used in 700 wells in South Australia over the last 40 years without any environmental incidents.

The eNGO's claims and hysterical use of social media to ban and shut down oil & gas production all together, along with fracking is just total rubbish, without any factual foundation to support their claims, unfortunately the South-East has become part of a global movement of eNGO's which want ALL fossil fuels banned !

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 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'.

Hydraulic Fracture Stimulation (Fracking)

We are sure The Committee will receive many submissions, and some will detail the actual process of fracking, so we shall not go into detail of the process, except to give an overview.

A more detailed view is contained in our Attachment A – and the following is a short summary from that paper:

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

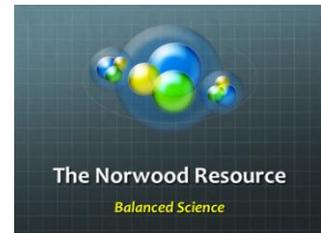
Hydraulic fracture stimulation of hydrocarbon reservoir rocks that have a structure and fabric rendering them relatively impermeable to the movement of gas and liquids is undertaken to increase their permeability. The target reservoirs which are particular geological formations, usually at significant 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.

It should be noted that the fractures caused by the fracking process typically extend from 10 meters to 100 meters from the well bore. To put this into perspective for the recent (2014) drilling done by Beach Energy in the South-East, the two wells drilled were approximately 4km (4,000 meters) deep. The fractures, **if these wells were fracked** would only be 100 meters extension from the well bore, and if these fractures propagated upwards toward the ground level would only reach 100 meters. So the fractures would still be 3.9 km (3,900 meters) below ground level.

Ground Water Contamination

As you are no doubt aware fracking has been undertaken in South Australia in the Cooper Basin for around 40 years, with upward of 700 wells being fracked, being oil & gas wells and geothermal wells. In the Cooper Basin the drilling for the wells has been through the Great Artesian Basin. During this time (40 years of fracking events) there has not been any instance of groundwater contamination. This aspect alone should allay concerns about the risk of



groundwater contamination from fracking (as well as from the drilling of unconventional and conventional wells).

Furthermore, within the same vicinity in the Cooper Basin 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 South-East of South Australia.

The oversight for the drilling and fracking of these well has rested with the SA State Regulator which has built up a fine track record and knowledge base in regard to oil and gas operations, particularly fracking. **This is the same Regulatory group which oversees the compliance to licences and regulations of all oil & gas drilling and any fracking activities which may occur in the South-East of the State. The same Regulatory team which has overseen the drilling of 120 wells in the South-East over the last 30 years – without any impact upon groundwater.**

As a consequence the confidence level of fracking being undertaken in the South-East of the State will be as safe and subject to the same high levels of compliance with regulations is extremely high.

The following is an extract from the Attachment B, and can be referenced with the included web addresses.

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

In rural communities 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 3.5 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:

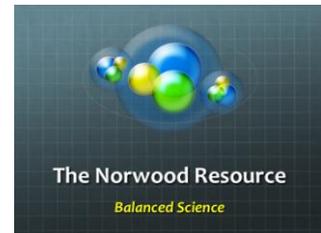
- Salinity
- Nitrates (fertilizers etc)
- Pesticides (spraying for pests etc)
- Associated risks from existing and continuing agriculture activities
- Dairying
- Septic waste.

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>



With the current Regulatory oversight by the Regulatory team in the Department of State development, as well as the other Government regulatory groups, such as the EPA, this really is a non-issue.

The Impacts on Landscape

Impacts upon landscape can be a subjective criteria, however, if one considers and then compares the commencement of drilling operations for a conventional well (without fracking) to a well with fracking, essentially the difference is additional trucks and heavy machinery and noise (equivalent to a construction site) for a short period of time, being 2 to 4 weeks, perhaps longer, but in terms of weeks, not months on end nor for years.

This Inquiry is about fracking of wells, not for conventional (non fracked wells), and so the difference is the fracking procedure, and so the impact upon the landscape is nil to slight additional pipework at the well site on an ongoing basis.

So, in essence, there is no discernable difference to the landscape once the fracking procedure has been completed compare to conventional well, of which 120 have already been drilled in the South-East of South Australia.

In relation to competition with agriculture, being mindful of the experience in the North of the State in the Cooper Basin where fracking has been going on for 40 years or so which has harmoniously co-existed with the production of organically certified beef, TNR is of the view there is ample scope for these industries to harmoniously co exist in the South-East as well.

Further, Mining in Australia covers approximately 0.02% (1400 sq. km) of the land surface, whereas agriculture (excluding pastoral leases) covers 4.6% (45,000 sq km) in South Australia alone see <http://bit.ly/1CVzuLY> On a comparison basis, mining is hardly in deep and divided competition for land, nor is it pushing farmers off their land in the South-East.

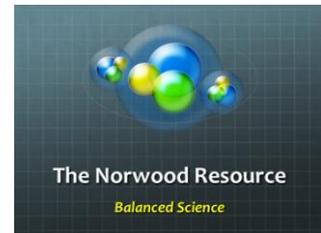
The impact of fracking upon the landscape compared to the other 120 hydrocarbon wells already drilled in the South-East is really a non-issue.

The Effectiveness of Existing Legislation and Regulation

In regard to the existing Legislation, the South Australian Petroleum and Geothermal Energy Act 2000 (PGEA), administered by the currently highly experienced and industry regarded Regulator is very effective, and South Australians are benefitting from this through the strict regulatory regime, with a very innovative team at the Department of State Development.

The fact that oil & gas exploration and production has been ongoing throughout the last 40 to 50 years, in the Cooper Basin as well as the South-East of the State has enabled successive State Governments to enact Legislation as issues arose and circumstances changed. This iterative process has allowed South Australia to have very robust Legislation currently which has also enabled the regulatory function to grow in experience and knowledge over this time.

As a result, in South Australia in particular the oil & gas participants have a high level of confidence in the State's Regulator, as does the Government, and so should local communities and the general public. Perhaps further information about the depth of experience and knowledge of the Regulatory team could be disseminated to communities that maybe impacted by exploration activities very early on in an exploration programme. The Regulatory team some years ago did commence a series of 'Roundtable discussions with interest groups and community representatives, perhaps simple fact sheets and the like, for community distribution may also assist in providing information to residents of communities which may have



exploration activities in their local vicinity. Communities should have the highest level of regard for their Regulator, as the Regulator is their 'policeman' to ensure that oil & gas activities are undertaken safely and in accordance with the States strict regulatory code the South Australian Petroleum and Geothermal Energy Act 2000 (PGEA).

There currently is a rigorous process for the Licencing and Approvals for exploration, retention and production activities in South Australia. These are broken down into stages, and each stage must be met before the Regulator approves such things as Licencing, Environmental Assesment and Approval of Environmental Objectives, and the stage 3 being Activity Notification and Approval. All stages need to be completed to compliance before activities can commence. There are timeframes within each stage to ensure a steady progress of the process.

As mentioned, the Regulator has also initiated and convenes 'roundtables', which are attended by industry, Government, peak bodies for protecting the environment, environmentalists, research institutions, aboriginal representatives and others. This has evolved into at least 7 working groups with the aim for open and frank discussion and to communicate with regional groups and representatives.

The Committee should be pleased that the requirements for good oil & gas field practice in the South-East are already well in place with a robust PGEA and a very experienced Regulatory team. Again, this really is a non-issue.

The Potential Net Economic Outcomes to the Region and the rest of The State

The potential net economic benefit of a successful commercial discovery will depend upon a multiple of aspects, not the least of which is the size of the discovery, and the location.

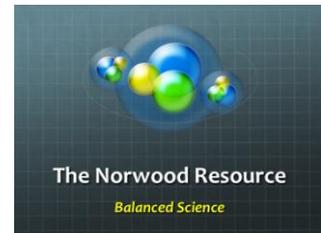
In regard to the commerciality of a discovery, a discovery generally will be adjudged commercial by the Operator and its joint venture partners based upon a number of factors. To date discoveries in the South-East have been relatively small, and if this pattern was to persist, then the economic benefits, will also be relatively small, although for a local economy, a small commercial discovery may be big in terms of local involvement, and economic benefit to it.

The benefits flow to the local community in terms of 'new money' flowing into the regional community, through the expenditure of goods and services, eg food for additional people employed on drilling and fracking operations, as well as services in terms of accommodation etc. So local economies benefit, even from the exploration activities, as has been witnessed in many communities when exploration comes to the local vicinity.

In the event of a commercial discovery, and a production programme is initiated, there is construction work that generally will flow to locals, as well as goods and service supply, and this will continue on an ongoing basis. If the discovery is gas, then the local gas users are also likely to benefit through a lower cost of gas, since there are very small or nil pipeline transport costs, this can equate to \$1.00 per gigajoule reduction in their gas costs.

In the event of a very medium size gas discovery, the whole community benefits, as there may be substantial construction and investment of a gas plant, pipelines and perhaps compressor stations.

An additional upside of course is the chance to upskill for the local workers to participate in the industry, the added benefit is that this may also enable families stay together, as a lot of opportunities for careers may be available.



In the event of a very large discovery, the potential benefits could be enormous, not only to the South-East, but the State as a whole. We have seen this in recent times with the advent of the construction of three LNG plants in Gladstone, Queensland. The investment in these plants is in the order of \$80 billion dollars, and this has added to regional economies, creating issues of accommodation etc, but the economic benefits to affected communities have been enormous. The flow on of this sort of expenditure to the State in terms of investment for support industries has been sufficient to materially lift Queensland's GDP.

On a longer term basis, the royalties flowing to the State will benefit all, since there is less pressure to raise money from other sources, such as State taxes and fees, and allows an added bonus for the State to invest in infrastructure and services for the benefit of the community.

Potentially, the economic and flow on benefits could be as big as the benefits derived from the Cooper Basin, or more.

In Summary

- **Fracking is not new in South Australia, with 40 years of experience 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 have 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.**
- **Over 120 wells have already been drilled in the South-East and a gas production plant (Katnook) constructed, established and has operated in the South-East over the last 20 years, without a murmur of any of these issues..**
- **SA probably has one of the most rigorous Regulatory in Australia through the PGEA which has benefitted from over 50 years of oil & gas exploration and production activity in the State.**
- **The PGEA is ably managed by a Regulator team which is probably the standout in Australia with deep experience, knowledge and initiative in bringing groups together.**
- **The potential economic benefits depend upon the size of the discovery/s, if small commercial discoveries are the norm for the area, the benefits will mostly be localised, however, large discoveries are likely to benefit the State in much the same way the Cooper Basin has over the last 40 years.**

It is probably worthwhile also 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." He went on to note

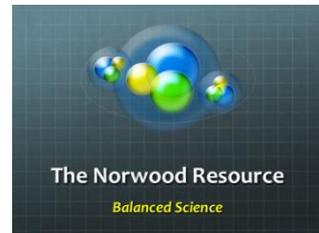
"Those are the engineering concerns, and that's what the Royal Academy of Engineers' report said and actually multiple other reports have all essentially said the same thing. But the public or publics who are protesting, at least in some parts of the world, about fracking are coming at it from a different 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, which among other things will permit fracking below 300 meters has passed the house of Lords, and has only to go through a round of proposed amendments prior to been forwarded for Royal Assent, which likely to occur this month.

In relation to the criteria specified by Professor Sir Mark Walport UK Chief Scientist, (highlighted above) and apply it to the fracking wells in the South-East;

- 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 Assesment 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.

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



TNR requests that The Committee rely upon the facts and the science and allow common sense to prevail in its deliberations to approve that drilling and fracking in the South-East is as safe as any other drilling operation, of which 120 wells have been drilled to date.

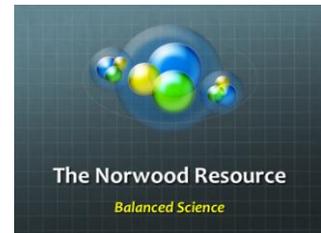
Further, given that there is an excellent history of over 700 wells which have been fracked in the North of the State, there is no requirement to recommend any further levels of approvals, compliance or regulatory requirements, as the tools are already in place, and have been proven to work well

Yours sincerely

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

Bruce Holland
Secretary
The Norwood Resource

Mobile 0417 357 508



About The Norwood Resource Incorporated (TNR)

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