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Natural Resources Committee
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RE: Submission to fracking inquiry

Dear Patrick

The Conservation Council of South Australia (Conservation SA) welcomes the opportunity to provide comment on the Natural Resources Committee Inquiry into potential risks and impacts in the use of hydraulic fracture stimulation (fracking) to produce gas in the South-East of South Australia.

Conservation SA is an independent, non-profit and strictly non-party political organisation representing around 50 of South Australia's environment and conservation organisations and their 90,000 members. Conservation Council SA has developed a comprehensive view of environment policy in South Australia in a Changing Climate: A Blueprint for a Sustainable Future - Second Edition[1]. This document sets out, at a strategic level, policy positions in six key environmental areas, including biodiversity, coast and marine, waste, planning and development, energy and water.

As a new and highly contested technology with enormous potential impacts, Conservation SA strongly believes it is appropriate for the SA Parliament to closely examine all aspects of unconventional gas extraction.

In particular, the potential impacts on human health and climate change should be addressed by the Committee as part of this current Inquiry, as it is impossible to assess the risks and impacts of fracking without them.

Australia is party to a global commitment to contain global warming to 2 degrees. This requires 80% of known fossil fuel reserves to stay in the ground. Due to lags in the climate system and feedback loops, the most critical window to prevent dangerous climate change is in the next decade. Methane has far greater global warming potential in this timeframe than carbon dioxide, so avoiding its release must be our urgent priority. Yet, methane release into the atmosphere is a significant impact of this process.

[1] http://www.conservationsa.org.au/images/CCSA_Policy_Blueprint_2013_Final.pdf

Despite claims, hydraulic horizontal fracturing is a new activity with impacts far different from conventional gas extraction.

Other states have allowed fracking to proceed in the absence of either baseline monitoring allowing its impacts to be quantified or regulatory regimes that provide protection and assurance to communities. The result has been strong community campaigns opposing unconventional gas developments, patchy and inconclusive science leaving decision makers in an information vacuum, and ongoing uncertainty and costs for gas project proponents. South Australia will do itself no favours if it does not learn from these experiences.

It is essential that the companies engaged in fracking and unconventional gas secure a strong social licence to operate; a licence that currently does not exist in South Australia, particularly in the South East.

Recommendation 1: ***Development of a technology known to release high rates of methane is utterly incompatible with goals to avoid dangerous climate change. Conservation SA therefore opposes any development of SA's unconventional gas resources.***

In recognition that this position is in direct conflict with that of the South Australian Government, we have a secondary recommendation.

Recommendation 2: ***Conservation SA calls for a moratorium on all unconventional gas exploration and development in the South East and beyond, until :***

- ***comprehensive baseline data has been collected in all relevant regions on human health, ecological systems, groundwater chemistry, methane emissions, landscape changes and seismic activity***
- ***Far stronger regulatory regimes have been developed (eg separate agencies promote and regulate gas development, communities have easy access to realtime data, gas producers have clear legal liability for makegood provisions far beyond the life of gas projects)***
- ***A cost-benefit analysis has been undertaken that considers the short-term economic benefits of gas extraction with the risks to other industries important to the state's economy, the impact of future carbon costs and the risk of stranded assets, and the risk of irreversible damage to South Australia's environment and the health of our communities.***

In response to the specific Terms of Reference:

1. The risks of groundwater contamination

Water is the lifeblood of the South East, with groundwater a finite and already fully (and arguably over) allocated resource.

According to the SE NRM Board[2], less water is flowing into both the unconfined and confined aquifers due to lower rainfall, underground water extraction and

[2] SE NRM Board, WATER ALLOCATION PLAN FOR THE LOWER LIMESTONE COAST PRESCRIBED WELLS AREA PREPARED. November 2013

interception of recharge. The South East is experiencing prolonged dry conditions and increasing salinity. With climate change, this trend will only continue.

In this context, any new water intensive activity that risks the integrity and quantity of groundwater resources needs to be treated with extreme caution.

Fracking is a thirsty technology. Each shale gas frack requires between 9 million and 29 million litres of water; an activity that occurs multiple times per well.[3]

The fracking liquid includes chemicals that are highly toxic, and other toxic metals in the fractured rock are mobilised by the fracturing process. A significant proportion of this toxic liquid remains underground where it can risk groundwater systems.

Each well penetrates the aquifer system. This system is already perforated with fractures, faults, sinkholes and other anomalies arising from its primary limestone form.

During 2001 to 2010, there were 120 leaking aquifer wells in the South East that have required rehabilitation costing $5.5 million.[4]

There have been recent cases of old drill holes being found in poor repair following years of neglect.[5]

According to a report commissioned for the Australian Council of Learned Academies (ACOLA) assessing the risks from shale gas extraction, [6] the probability of 'well failure', and 'over extraction from aquifer resulting in reduced water availability for the environment or other users/aquifer interference' are both regarded as 'likely'.

This same study estimated there were already 3,446 shale gas wells in the Otway Basin, mainly on the South Australian side.

The risks arising from potentially tens of thousands more wells across the South East are therefore deeply concerning.

2. <u>The impacts upon landscape</u>

The key difference with the environmental risk of unconventional gas extraction as compared with equivalent scale conventional gas mining operations is the number of wells required. Where a conventional gas field can be drained by a small number of wells, many unconventional gas mining operations require thousands of wells.

[3] Wood Ruth, Gilbert Paul, Sharmina Maria, Anderson Kevin, Footit Anthony, Glynn Steven, Nicholls Fiona. Shale Gas : a provisional assessment of climate change and environmental impacts. Tyndall Center for Climate Change Research, 2011. Available at www.karooplaces.com/wpcontent/uploads/2011/06/coop_shale_gas_report_final_200111.pdf

[4] SE NRM Board, WATER ALLOCATION PLAN FOR THE LOWER LIMESTONE COAST PRESCRIBED WELLS AREA PREPARED. November 2013

[5] http://www.coastalleader.com.au/story/1766183/prepared-to-fight/

[6] http://www.acola.org.au/PDF/SAF06FINAL/Frogtech_Shale_Gas_Geology_and_Risks%20Jan2013.pdf

Unconventional gas mining is highly likely to have a significant, negative impact on the landscape, primarily through terrestrial landscape disturbance and degradation, the spreading of invasive feral species, and pollution (to the atmosphere, to soil, and to water).

Impacts on biodiversity can occur through the degradation or complete removal of a natural habitat through excessive water extraction, the splitting up of a habitat as a result of road construction or fencing being erected, or from construction of the well-pad itself. After fracking, toxic fluid is left to evaporate in ponds, releasing volatile organic compounds that pose environmental and health risks.

There is a significant risk of new, invasive plant, animal or micro-organism species being introduced during the development and operation of the well, or the construction of new road infrastructure, affecting both land and water ecosystems.

3. <u>The effectiveness of existing legislation and regulation</u>

According to ACOLA , there is limited or insufficient understanding of many environmental impacts and surface and subsurface physical, chemical and biological processes related to shale gas extraction.

We simply do not know enough.

We have little detailed information about the natural interactions between SA's groundwater systems and the underlying geology. If pollution incidents do occur, we have little understanding about the type or scale of damage to the environment, to farmland, and to public health that might flow from such incidents.

It is therefore critical to undertake detailed baseline surveys and monitoring to significantly improve knowledge of the potential environmental impacts of shale gas. These include baseline information on human health, ecological systems, groundwater chemistry, methane emissions, landscape changes and seismic activity.

By its nature, baseline information can only be collected before fracking takes place. Therefore it is essential to have a complete moratorium on horizontal fracking in SA, while this work is undertaken.

Certainly, it is essential for the development of community trust that this work be done before any exploration commences.

Like any new, invasive and disruptive technology, the overall impact on the community is heavily reliant on effective regulatory oversight and good corporate conduct.

At this point in time, there is significant and widespread community concern about perceived 'regulatory capture', with the government department responsible for aggressive promotion of unconventional gas also responsible for its regulation.

This concern is exacerbated by a lack of pertinent, real time information flow, and inadequate reporting.

Conservation SA does not support unconventional gas, but if it does expand as planned, far tighter rules must be developed to protect public health as well as water supplies. These rules must be actively monitored and enforced.

However, in the end, no amount of regulation will stop inevitable leakage. Therefore, a critical question is: who will look after wells when finished?

According to ACOLA[7]:

- because of the high potential for groundwater contamination from the wells, decommissioned wells need to be effectively sealed for hundreds if not thousands of years.
- well operators should face open-ended liability for failures into the future.
- Impartial inspection of the quality and fit of drilling casing during operation and after decommissioning is vital, with the results available publicly.

4. <u>The potential net economic outcomes to the region and the rest of the state</u>

The South East is home to a range of high value agricultural and tourism industries.

Unconventional gas threatens these established industries both directly, via groundwater impacts and pollution, and indirectly, through loss of the 'clean and green' status and tourism allure.

South Australia rightly celebrates and promotes its premium food and wine from a clean environment. This delivers real return for the state and can continue to do so for generations to come.

Visitors are not attracted to country dotted with drill rigs and impacting on natural ecosystems. Our clean food reputation (much of it export driven) is at significant risk of a contamination incident.

Once lost, this reputation will be impossible to recover.

Unconventional gas extraction is a short term, low job producing industry. It is essential we prioritise economic activity that creates long term, sustainable value.

[7] http://www.acola.org.au/PDF/SAF06FINAL/Frogtech_Shale_Gas_Geology_and_Risks%20Jan2013.pdf

In addition to these 4 Terms of Reference, Conservation SA strongly recommends the Committee consider other impacts, including:

Potential for the use of fracking to impact on public health

A number of international reports have indicated the potential of hydraulic fracturing and associated processes to lead to significant adverse impacts on human health.

The New Brunswick Department of Health report into shale gas fracking[8] outlined several impacts on human health leading from unconventional gas extraction, including:

- Physical hazards, due to accidents, malfunctions, emergencies etc.
- Environmental hazards, due to the quality of air, water, soil and/or food
- Mental health impacts to individuals
- Socioeconomic impacts on communities
- Other impacts such as cumulative effects (i.e. traffic increases, noise), radiation etc.

Many of the health risks flow directly from the environmental threats (such as pollution of air and water) and are related to the toxic nature of the chemicals associated with unconventional gas fracking. Researchers in the United States[9] examined 353 chemicals used in fracking fluids, and found them to include toxic, allergenic, mutagenic and carcinogenic substances.

Impact of fracking on climate change

Compared to oil and coal, gas does produce less CO2 gas when it's burned. But to adequately assess the greenhouse impact of any fuel source, emissions from the entire life cycle must be considered.

A growing number of studies clarifying the climate impacts of unconventional gas conclude that:

- emissions from unconventional natural gas are significantly higher than previously thought, mainly due to methane leakage;
- emissions are substantially higher than estimates reported in bottom-up inventories; and
- coal-to-gas substitution will not bring the previously assumed climate benefits.

For a summary, go to:
https://www.zotero.org/groups/pse_study_citation_database/items/collectionKey/WEICK6IC

[8] Chief Medical Officer of Health's Recommendations Concerning Shale Gas Development in New Brunswick, New Brunswick Department of Health 2012. Available at: www2.gnb.ca/content/dam/gnb/Departments/hs/pdf/en/HealthyEnvironments/Recommendations_ShaleGasDevelopment.pdf

[9] Colborn Theo, Kwiatkowski Carol, Schultz Kim, Bachran Mary, Natural Gas Operations from a Public Health Perspective, in the International Journal of Human and Ecological Risk Assessment, 2010. Available on : http://www.endocrinedisruption.com/files/Oct2011HERA10-48forweb3-3-11.pdf

Methane emissions through leakage are between 30% higher to double that of conventional gas extraction[10]. This is of grave concern as methane is 34 times more potent than CO2 over a 100 year period or 86 times more powerful over a 20 year period[11].

These higher emissions of unconventional gas are not currently counted. This inadequacy of current carbon accounting systems gives unconventional gas an unfair advantage over other fuel sources, and even allows it to displace development of much lower-carbon energy sources such as renewable energy.

The simple fact is: if we want to have any chance of avoiding dangerous climate change (2 degrees warming or less) we need to radically reduce all fossil fuel extraction as soon as possible.

It is foolhardy in the extreme for South Australia to be considering new, highly polluting energy sources.

This is particularly true as we have a fantastic alternative in renewable energy.

In fact, South Australia is truly a world leader in the penetration of renewable energy into our electricity grid. We should be rapidly expanding this job-rich industry even further rather than embracing the risks and impacts of fracking.

As the peak body for the environment sector in SA, Conservation SA would like to appear before the Committee to discuss our submission in more detail.

Kind regards,

Craig Wilkins

Chief Executive

[10]Howarth, R., Santoro, R., Ingraffea, A, 2011: *Climate Change* http://www.motherjones.com/files/04-11shale_gas_footprint_fulltextpdf.pdf

[11] Myhre, G., D. Shindell, F.-M. Bréon, W. Collins, J. Fuglestvedt, J. Huang, D. Koch, J.-F. Lamarque, D. Lee, B. Mendoza, T. Nakajima, A. Robock, G. Stephens, T. Takemura and H. Zhang, 2013: Anthropogenic and Natural Radiative Forcing. In: Climate Change 2013: The Physical Science Basis. Contribution of Working Group I to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change [Stocker, T.F., D. Qin, G.-K. Plattner, M. Tignor, S.K. Allen, J. Boschung, A. Nauels, Y. Xia, V. Bex and P.M. Midgley (eds.)]. Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA. http://www.climatechange2013.org/images/report/WG1AR5_Chapter08_FINAL.pdf