Submission to Inquiry into the Implications for Western Australia of Hydraulic Fracturing for Unconventional Gas

I submit that the use of hydraulic fracturing – fracking - for unconventional gas within Western Australia is both risky and an unnecessary direction for our energy future.

Expand the Terms of Reference

Firstly, the terms of reference of the Inquiry appear to miss the purpose for which the Environment and Public Affairs Committee was established. The Committee Terms of Reference 1.4 states "The Committee, where relevant and appropriate, is to assess the merit of matters or issues arising from an inquiry in accordance with the principles of ecologically sustainable development and the minimisation of harm to the environment." and the Purpose further states "Ecologically sustainable development is a philosophy defined by the National Strategy for Ecologically Sustainable Development as 'development which aims to meet the needs of Australians today while conserving our ecosystems for the benefit of future generations'" (Parliament of WA, 2013).

The National Strategy for Ecologically Sustainable Development (ESD) further clarifies the need to focus on the environment in making decisions on resource use "By following an ecologically sustainable path of development, we should be able to reduce the likelihood of serious environmental impacts arising from our economic activity. .... More practically, ESD will mean changes to our patterns of resource use, including improvements in the quality of our air, land and water, and in the development of new, environmentally friendly products and processes" (Australian Government, 2013).

Alternatives to Unconventional Gas

The evidence of the human influence on climate change is overwhelming and grows daily with measurable impacts on atmospheric temperatures (University of Adelaide, 2013) and influence on extreme weather events (NOAA, 2013).

Rather than attempting to extract further fossil fuel at an increasing cost both economically and ecologically we should be examining ways to use proven and emerging technologies that provide a much cleaner alternative. WA has among the best solar, wind and wave resources in the world and the potential to generate renewable energy from these resources is enormous (SEN, 2013). It is now feasible to satisfy the State's electricity demands solely from renewable resources at costs comparable to conventional (fossil) technologies (SEN, op.cit.; Hannam, 2013). By 2030 it is likely that renewable technologies will have the lowest levelised cost of energy (LCOE) of any technologies (BREE, 2013, p5).

Health impacts of Unconventional Gas

As well as the detrimental impacts of climate change alluded to above there are other health impacts of fracking. Development in areas surrounding regional towns and on farmland, will result in significant numbers of people being exposed to unnecessary health risks.

Air pollution is an inevitable by-product of fracking operations (Broomfield, 2012). Exposure to air pollution resulting from fracking has been documented to increase the risk of cancers (particularly leukaemia), neurological diseases, impacts to the nervous system, asthma, along with plethora of other undesirable health effects (Colborn etal, 2011). Conclusions from the literature assert the need for further health impact assessments before allowing the unconventional gas industry to continue development (McKenzie etal, 2012).

It has been argued that gas is "cleaner" than coal in that burning it produces less green house gases than burning coal. There is mounting evidence that this is not the case for unconventional

gas. Unconventional gas uses more energy to extract it and more importantly is accompanied by increased methane emissions (Stephenson etal, referenced in Skeptical Science, 2013).

Community Attitudes to Unconventional Gas

Recent media attention on coal seam gas in Queensland and coal exploration in the south west highlights both potential problems with exploiting these resources and lack of public support for them. There is broad Community opposition to fracking (Diss, 2011; Hanson, 2013; Taillier, 2013). It is essential that these concerns be addressed by the Inquiry. As stated previously, there are much more benign alternatives to provide our energy needs. These need to be seriously investigated and the community made aware of them.

Regulations pertaining to Unconventional Gas

There are deficiencies in the current legislation and regulations related to unconventional gas – shale gas, coal-seam gas, etcetera (Hunter, 2011). A number of these have been addressed by the WA Department of Mines and Petroleum WA (DMP, 2011), however, there are still others to be addressed:

- A number of the deficiencies identified by Hunter (op.cit.) still need to be rectified, including the need to make environmental management plans legally enforceable
- The current approach to environmental evaluations for fracking operations is to assess each case on it's (own) merit. Due to the widespread nature of unconventional gas resources, the need to develop many multiples of wells to extract the gas and the large areas covered by water aquifers there is a need to consider regional impacts when undertaking environmental assessments
- As the role of the DMP is to support exploitation of the State's mineral resources it is highly questionable that the environmental and ecological management aspects of resource extraction can be effectively managed by this department
- The legislation does not adequately deal with detrimental events that may occur many years after "end of life" of gas extraction

Addressing the Terms of Reference

a) how hydraulic fracturing may impact on current and future uses of land

The 'footprint' of any well and associated infrastructure will impact on current land use. New extractive industries such as unconventional gas extraction "are contesting farmers long held views that they have a right to decide who has access to their property and a right to decide what happens on their land. While miners may have a legal right to access property, farmers have a perceived right to exclude them based on governments having historically failed to act on their ownership of underground resources in many closer settled agricultural areas of Australia" (Kerr, 2012). This potential conflict needs to be resolved to create a more positive relationship between the industry, farmers and other land users and stakeholders. Gas extraction is likely to be a short term activity on land that has a long term use both before and after extraction. It is essential that the short term activity does not damage future long term use.

As mentioned above, legislation does not adequately deal with detrimental events that may occur many years after "end of life" of gas extraction. Who has liability for abandoned sites after well abandonment? Steps need to be in place to ensure landholders and the community aren't left to deal with the consequences.

In undertaking environmental approvals it is important that the potential widespread impact of any discharge into or out of aquifers (and the air) does not degrade sensitive areas or Conservation parks. The precautionary principle, central to ecologically sustainable development, means no development should occur near these areas. That is, no development should occur on or under any aquifer that is below a Conservation park.

b) the regulation of chemicals used in the hydraulic fracturing process

A report by the European Commission in 2012 concerning the risks associated with unconventional gas fracking concluded that there was a high risk of ground water contamination (Broomfield, op.cit.). The information supplied by the DMP (DMP, 2013) details that the majority of fluid pumped underground is a mixture of water and sand whilst approximately 0.5%, or between 35 and 100 tonnes per fracking operation, is a mixture of chemicals known as 'slick water'. The chemical make-up of slick water includes known toxic, mutagenic, allergenic, and, carcinogenic substances (Colborn etal, op.cit.). As well as reporting on what chemicals and additives are included in any fracking activity it is essential that the list of chemicals be restricted. No carcinogenic chemicals or materials that could be detrimental to the environment, surface water, ground water or water in deep aquifers should be allowed.

Many of these chemicals, along with those that naturally occur in the shale itself are then returned to the surface and placed in holding ponds. Amongst those potentially returned are dangerous substances such as arsenic, benzene, mercury and naturally occurring radioactive materials. Bamberger and Oswald (2012) determined that the concentrations of these chemicals are high enough to be toxic to humans and animals. Furthermore, they liken the actions of unconventional gas companies to the tobacco industry. By stating that they will continue operations until it can be proved conclusively that fracking is accompanied by a dangerous risk to human health; fracking companies run the risk of causing similar, devastating and long-lasting effects on public health.

Pollution of ground water can occur through a myriad of different ways, from catastrophic well failure to slower acting corrosion failures. Operator-wide statistics from Pennsylvania determine that even new wells drilled within the past three years have a sustained failure rate of around 6-7% (Ingraffea, 2013). Should these statistics be repeated in WA then one could expect that hundreds and potentially thousands of wells would have a compromised structural integrity, and potentially cause irreversible damage to our aquifers. Whilst many of the risks concerning ground water pollution can be reduced by best practice the prevalence of well failures in Pennsylvania, a significantly more established industry than Australia, demonstrates that they will never be completely mitigated.

c) the use of ground water in the hydraulic fracturing process and the potential for recycling of produced water

DMP asserts that between approximately 7 million litres and 21 million litres of water will be required for each fracking operation (DMP, 2013). With the many thousands of wells that could be developed to exploit unconventional gas, the volume of water required is significant, potentially in the billions of litres. With the increasing importance of underground water (including recharge of aquifers) to the provision of drinking water, particularly in the South West (Water Corporation, 2009) we need to ensure these valuable resources are not impacted by unconventional gas extraction.

There is potential to reuse water extracted by fracking one well in subsequent wells (Groom, 2013). "The practice scales down the amount of freshwater used for fracking, but environmentalists say it does nothing to assuage concerns about groundwater contamination, and only facilitates the extraction of fossil fuels that produce climate-warming gases. 'It doesn't lessen the potential for groundwater contamination, and it can increase the amount of contaminants that you are exposing the groundwater to,' said Myron Arnowitt, Pennsylvania director for Clean Water Action". With appropriate care this could reduce the impact of the overall extraction of unconventional gas, but it doesn't reduce the argument that exploitation of these resources is unnecessary.

d) the reclamation (rehabilitation) of land that has been hydraulically fractured

Who is liable for contamination of water that occurs after a well has been abandoned? Companies are obliged to 'monitor' for two years after well abandonment. That is the point at which their obligations cease, but the wells remain a pollution threat forever. Pollution might occur post-well abandonment but as no monitoring is done this could create a public health "time bomb".

Conclusion

The Environment and Public Affairs Committee was established to act in accordance with the principles of ESD and the minimisation of harm to the environment. This means changes to our patterns of resource use and the development of new, environmentally friendly products and processes. Adopting renewable energy generation far outweighs any gains unconventional gas is purported to offer and would come without the accompanying health and ecological risks.

With WA's almost unbeatable supply of natural renewable energy resources we have the capacity to be a leader in a 21st century energy market dominated by renewable energy rather than continuing to support a harmful extractive industry that is threatening us with global warming, air pollution, water and land pollution, and thermal pollution (UCSUSA, 2002).

Angus King

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