19 March 2018

Independent Scientific Panel Inquiry
Locked Bag 33
Cloisters Square
PERTH WA 6850

Email: info@frackinginquiry.wa.gov.au

Re: Scientific Inquiry into Hydraulic Fracture Stimulation in Western Australia

Dear Panel,

UIL Energy welcomes the opportunity to submit the following comments to the Panel, taking into consideration the terms of reference as noted below:

- Identify environmental, health, agriculture, heritage and community impacts with the process of hydraulic fracture simulation in Western Australia, noting that impacts may vary in accordance with the location of the activity;
- Use credible scientific and historical evidence to assess the level of risk associated with identified impacts;
- Describe regulatory mechanisms that may be employed to mitigate or minimise risks to an acceptable level, where appropriate;
- Recommend a scientific approach to regulating hydraulic fracture stimulation; and
- Hold community meetings in Perth, and the Midwest and Kimberly regions.

UIL Energy is of the strong view that the outcomes from many previous studies on the risks of HFS and the existing levels of regulation in place in Western Australia, collectively point to the benefits of moving forward with HFS to secure needed energy for Western Australia.

UIL Energy commends the parties responsible for all the background papers released with this inquiry. They provide great insight into Western Australia's past experiences with hydraulic fracture stimulations (HFS) and are a good basis for further dialogue and understanding for all stakeholders.

UIL Energy's present exploration interests are in the Perth Basin along the western margin of the Dandaragan Trough where previous wells have demonstrated the presence of recoverable natural gas with flows of gas (with minor liquids content) to surface on testing from Jurassic aged low permeability sandstones. UIL Energy is focused on both conventional and unconventional targets and therefore there is some probability that wells productive of gas drilled on this trend may require some form of stimulation to enhance deliverability and economics.

Although flows of natural gas have been tested along the trend high-graded by UIL Energy, development may require the application of reservoir stimulation technologies either in vertical, deviated or wellbores drilled horizontally. The most likely reservoir stimulation technology which could be used is HFS, the principal operational subject of this inquiry. The scale or intensity of such stimulation treatments are unknown at this time and will be tailored to achieve economic flows of petroleum.

UIL Energy made a submission to the previous inquiry in 2013 and a copy of that letter is attached. This submission addressed questions around the process, impacts and risks of HFS and provided comments on the regulatory mechanism that may be employed to minimise risks.

Since that submission significant progress and understanding of HFS has occurred particularly in North American operations. Indeed, the period of lower oil prices (themselves perhaps a result of the success of hydraulic fracture stimulation of tight oil plays) has seen an immense improvement in the stimulation and completion process in specific (shale) basins with high quality targets. As examples, the Permian basin in west Texas, the Devonian Marcellus and equivalent shales in Pennsylvania, the Triassic Montney and the Devonian Duvenay in the Western Canadian Sedimentary Basin.

There is no question the “shale” revolution resulting from the enabling technologies of horizontal drilling and hydraulic fracture stimulation has created enormous economic benefits, yet also imposed additional costs and impacts on local community stakeholders. These impacts and costs are often related to the scale of activity in those regions. Many of the issues and impacts are moving targets which are challenging to the industry, communities and regulators as discussed by Raimi (2017).

In spite of all these activities, which have revolutionised the global oil and gas industry in terms of sources of supply since our last submission in 2013, there has been limited, if any, new information that would suggest the process of hydraulic fracture stimulation should invoke the precautionary principle in the regulatory process.

As will be familiar to the Panel, numerous inquiries both in Australia and overseas have established that the process is as safe as is reasonably possible, if communities and local situations support its application and provided the process is properly conducted and appropriately regulated (as appropriately summarised in the submission from Norwood Resource).

UIL Energy agrees regulations should reflect the best science based research available and may need to be revisited from time to time. UIL Energy is of the view that the high standard of scientific information provided to the inquiry in the Northern Territory to address stakeholder issues could be sourced for deliberations on regulatory policy in those parts of Western Australia with similar geographic and hydrologic situations.

When considering the contemporary understanding about HFS in onshore Australia, it is important to acknowledge that more research, experimentation and operational procedures have occurred in North America. The inquiry also should consider if the scale of operations seen in the USA will eventuate in onshore Australia. There are many enablers in the USA, in particular supportive logistics that allow for HFS and related activity to take on a scale that will not be seen in Australia in the foreseeable future. The limitations on the likely scale of activity in Australia should be taken into consideration when evaluating the impacts in Western Australia.

While UIL Energy understands and supports the need to consider the impact to all stakeholders and best practices, UIL Energy is of the strong view that the outcomes from many previous studies on the risks of HFS, the existing levels of regulation in place in Western Australia, along with the limited likely scale of HFS in the State, collectively point to the benefits of moving forward with HFS to secure needed energy for Western Australia under existing regulations and review, with the open mind to review best practices on a practical level as needed.

UIL Energy thanks the Panel for the opportunity to comment for the Inquiry and invites the Panel to follow up with any questions.

Yours sincerely

John de Stefani
Managing Director

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Reference: Raimi, D., 2017. The Fracking Debate – The risks, benefits and uncertainties of the shale revolution: Columbia University Press.

19 September 2013

Ms Margaret Liveris
Committee Clerk
Standing Committee on Environment and Public Affairs
Legislative Council
Parliament House
GPO Box A11
PERTH WA 6837

Re: Inquiry into the implications for Western Australia of hydraulic fracturing for unconventional gas

Dear Ms Liveris

UIL Energy (UIL) welcomes the opportunity to submit the following comments as per the terms of reference to the committee. The terms of reference are:

(a) How hydraulic fracturing may impact on current and future uses of land
(b) The regulation of chemicals used in the hydraulic fracturing process
(c) The use of ground water in the hydraulic fracturing process and the potential for recycling of ground water; and
(d) The reclamation (rehabilitation) of land that has been hydraulically fractured.

Introduction:

The process of hydraulic fracture treatment (or "fracture stimulation") has been utilized by the oil and gas industry since 1947 and is a fundamental stimulation treatment to enhance the potential productivity of wells. (King, 2012; see also www.hydraulicfracturing.com)

The process is essentially a four stage process, whereby the initial process is to pressure the rock using a fluid to create a fracture, followed by growing the fracture by continuing to pump fluid into the fracture, then pumping proppant materials into the fracture in the form of a slurry as part of the fracturing fluid and finally flowing the well ("flow-back") to recover the fracture fluids while keeping the proppant in place in the created fracture(s) (see www.csur.org)

The process is used extensively today – particularly in wells drilled onshore.

Where intense activities are taking place, namely in North America, the processes involved in hydraulic fracture stimulation continues to be researched and there is an ongoing evolution to optimize procedures, reduce costs and mitigate valid stakeholder concerns.

Hydraulic fracturing stimulation activities are in their infancy in Australia and are at the moment of smaller scale with a limited number of stimulated intervals (referred to as "stages") than those demonstrated to date in the USA and Canada where multiple intervals in excess of 30 stages have been completed. Australian operations will benefit from the transfer of enhanced technology once proven particularly in North America.

The issue of appropriate regulations in Western Australia has been addressed by Hunter (2011) in a report commissioned by the WA Department of Mines and Petroleum with a response (DMP, 2011).

UIL's approach is to:

- Assist regulators to develop best management practices to retain a social licence for the industry to operate while consumers have an appetite and demand for oil and gas; and
- Develop and maintain social licence to operate and provide benefits to the community.
- Engage with communities in which we may operate.

How hydraulic fracturing may impact on current and future uses of land

The process of hydraulic fracturing, if utilized, is best considered as a part of the work done to determine if a subsurface area has any merit for the future production of oil and gas. The impact is created by the drilling of a well for the purposes of oil and gas discovery and "hoped-for" production.

As such, the land disturbance is caused by access roads and the drilling site; the implications on current land use are well known in WA. These include the necessary clearing of trees and vegetation, removal and storage of topsoil, and the generation of dust, noise and exhaust fumes during operations. The vegetation clearing activities for resource companies are administered by the DEC under the Environmental Protection (Clearing of Native Vegetation) Regulations 2004 (The Clearing Regulations).

If the well is capable of production, most of the site may be reclaimed but wellhead assemblies, meters and tanks will remain on site for the life of the well. If the well is abandoned, the site can be reclaimed as per requirements and regulations.

The key concern involving the exploitation of unconventional oil and gas resources is the ***intensity*** of drilling required.

Fortunately, in addition to hydraulic fracturing, the other technology which has enabled the exploitation of "shale" resource plays, namely horizontal drilling and rotary steering drilling assemblies, means extremely long multidirectional lateral wellbores can be drilled from one pad, frequently called "ecopads".

These multiwall pads, although with a larger initial surface footprint (e.g. 2.5ha) compared to a single well site (e.g. 0.5ha), enables large subsurface areas to be exploited without intense surface disturbance as would be the case with many wells drilled from single surface locations in close proximity.

In the areas of potential unconventional gas development in Western Australia, namely the Perth, Carnarvon and Canning Basins, the impact of hydraulic fracturing operations will not be the same.

These areas have diverse uses and habitats with differing surface (for example, soil types, vegetation cover, historical significances) and subsurface characteristics.

Therefore, the impacts of gas field development including hydraulic fracturing on current and future land uses will be limited to a certain size of land disturbance, which applies to any land development application(s).

There is a provision for regulators (for example, under a Regional Development Scheme for each resource basin/region) to undertake land use cumulative impacts assessment taking into account impacts on land from current land users and proposed developments.

In practice, any onshore petroleum development should be treated the same as other land development applications such as agriculture activities, landfills, waste treatment plans, petrol stations and refineries as they have the same impacts on land and water resources.

Undesirable impacts on land could result from accidental spills with the perpetrator (the operator in the case of petroleum activities) held responsible for clean-up and remediation.

The regulation of chemicals used in the hydraulic fracturing process

There is a robust regulatory framework for oil and gas industry in WA. In 2012 the DMP implemented the following key legislative requirements for stimulation activities:

- Full disclosure of chemicals; and
- Public release of approved Environmental Plan.

In order to approve stimulation (fracturing) activities, the DMP requires detailed information to be submitted, including:

- the scale of the program;
- distances from nearest aquifer(s);
- all chemical additives used;
- volumes, management and disposal of water;
- integrity of well casings;
- fracture modelling and monitoring of fracking; and
- long term monitoring to determine whether chemical contamination is an issue.

In addition, BTEX chemicals are prohibited to be used in Australia in hydraulic fracturing operations.

UIL supports the DMP's initiative to develop a comprehensive reform package to strengthen the regulatory framework for onshore gas activities and agrees that it should be done in collaboration with industry and community.

The use of ground water in the hydraulic fracturing process and the potential for recycling of ground water

Although there are many elements raised concerning the use of ground water, whether it is fresh (potable) or unsuitable for agricultural needs or human consumption, the key emotive issues are:

- the source of water required for drilling and fracturing operations with unconventional low permeability reservoirs;
- the volume or quantity; and
- the quality or chemistry of the flow back water and its disposal.

Sources of water may be local, communal or regional concern depending on the quality and volume of the water sought. The presence of local water authorities, rivers, lakes or ponds in proximity to drilling sites may provide a source from which water needs can be met with appropriate licence or purchase. In more arid regions of surface water stress, water may be sourced from subsurface aquifers by drilling.

Under current WA regulations any water requirements including water for hydraulic fracturing are addressed under the Rights in Water and Irrigation Act 1914 via 5C licence to take water which is subject to the Department of Water (DoW) assessment. The licence requirements include provisions '*that operators must demonstrate that the volume of water extracted from aquifers will not have impacts on aquifers, the environment or other users*'.

There is provision for regulators to undertake surface /groundwater cumulative impacts assessment/modelling to understand potential impacts from all water users within a region/ water resource area(s) including agriculture, municipal, commercial, resource industry etc.

A misconception is that hydraulic fracturing requires the use of fresh water – this is not the case as even brackish and saline waters are considered to be alternatives to fresh water for drilling and stimulation activities.

The volume of water required for hydraulic fracturing depends on geological properties of the target formation; depths; horizontal length, and number of stimulation stages. Water volumes used in drilling and hydraulic fracturing operations in North America frequently quote volumes to from 7,500 – 45,000 kL per well. However, limited data is publicly available on water requirements for shale stimulations conducted to date in Australia.

The amount of fluid injected into shale reservoirs, which returns as flowback, ranges widely from 20% to 80%. The amount of produced water is also variable with the percentage depending largely on the mineralogical and petrophysical properties of the target formation. The amount and rate of return of injected water can be a positive factor if the returned water is recycled and re-used because less waste management is required.

To UIL's knowledge there is little experience with flowback quality from Australian shales or shales in Western Australia. This data has yet to be comprehensively compiled. Based on North American experience, returned water (flowback) from shales may contain salt, heavy metals, organic compounds and naturally occurring radioactive elements.

Developments in North America continue to demonstrate beneficial re-use of treated flowback and other water associated with drilling operations rather than seek avenues for appropriate surface discharge or subsurface injection via disposal wells. The percentage of water that is recycled varies by location and operator with some reporting 100% recycling per well (see Williams, 2012, page 27 about. Range Resources).

Indeed, operators desire and have an economic incentive to maximize water re-use and develop water treatment capabilities by themselves or with external parties. Recycled water could be beneficially used if effluent meets ANZECC standards for irrigation, stock watering, dust suppression etc.

In consultation with industry, regulators must develop guidelines for beneficial use of recycled water and safe and efficient effluent disposal options and pollutant limits, with an awareness of the differences in physical geology, local hydrology, climate, rainfall and runoff of specific geographic locations.

The Department of Mines and Petroleum recently explained current legislation on the handling of water related issues in a fact sheet about water use and management from the production of natural gas from shale and tight rocks in Western Australia.

The reclamation (rehabilitation) of land that has been hydraulically fractured.

Land itself is not hydraulically fractured but large areas at depth in the subsurface may be intensely fractured during the exploitation and recovery of unconventional petroleum resources.

The reclamation of drill sites and other disturbances (buried pipelines, roads) is the same as with other forms of drilling and surface activities.

Concluding remarks

There are robust legislative requirements for resource industry currently in place in WA. Risk based assessment and regulatory approvals are required for each petroleum activity. The Department of Mines and Energy is continuing to develop a comprehensive reform package to strengthen the regulatory framework for onshore gas activities.

UIL supports the government inquiry to investigate the impacts of hydraulic fracturing of unconventional gas. There are some of the best management practices on the industry's agenda such as ***use of green fracturing chemicals, reduction of chemical usage, fracturing treatment design, monitoring during hydraulic fracturing, information exchange and community engagement.*** However, due to limited time provided for comment UIL is unable to fully address these additional areas of potential reference.

UIL thank you for the opportunity to provide comment and trusts these comments are of use to the Committee. Should the Committee desire, UIL are happy to discuss these matters further.

Yours sincerely

John de Stefani
Chief Executive Officer

Useful References:

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