



29th May 2014

The Commissioner
Hydraulic Fracturing Inquiry
c/- GPO Box 4204, Darwin NT 0801

Dear Dr Hawke,

Origin Energy welcomes the opportunity to make a submission on the Terms of Reference for the *Inquiry into Hydraulic Fracturing in the Northern Territory*.

Origin also confirms its support for the submission lodged by the Australian Petroleum Production and Exploration Association (**APPEA**). The APPEA submission provides a detailed technical response on behalf of the industry to the Terms of Reference.

Origin has developed a specialised presentation on hydraulic fracturing which is designed to educate and inform the community about this industry practice. I would like to offer one of these presentations to you and your team as a way of sharing our experience with you.

About Origin Energy

Origin Energy Limited (**Origin**) (ASX: ORG) is the leading Australian integrated energy company focused on gas and oil exploration and production, power generation and energy retailing. A member of the S&P/ASX 20 Index, the company has more than 6,000 employees and is a leading producer of gas in eastern Australia. Origin is Australia's largest energy retailer servicing 4.3 million electricity, natural gas and LPG customer accounts and has the country's largest and one of the most flexible generation portfolios with approximately 6,010 MW of capacity, through either owned generation or contracted rights. Origin's strategic positioning and portfolio of assets provide flexibility, stability and significant opportunities for growth across the energy industry. Through the Australia Pacific LNG incorporated joint venture, Origin, along with ConocoPhillips and Sinopec, is developing one of Australia's largest Coal Seam Gas (CSG) to LNG projects based on Australia's largest 2P CSG reserves base.

In New Zealand, Origin is the major shareholder in Contact Energy, a leading integrated energy company, operating geothermal, thermal and hydro generation facilities and servicing electricity, gas and LPG customers across both the North and South islands. Origin is also a major operator and participant in petroleum exploration acreage in New Zealand.

Origin has a strong focus on ensuring the sustainability of its operations, is the largest green energy retailer in Australia and has significant investments in renewable energy technologies.

Origin's onshore interests in the Northern Territory

In May 2014, Origin, together with Sasol Limited (**Sasol**), announced the signing of a conditional farm-in agreement with Falcon Oil & Gas Australia Limited (**Falcon**) for three onshore exploration permits in the Beetaloo Basin.

Upon completion of the farm-in agreement, Origin and Sasol will each hold a 35 per cent interest in the three permits and Falcon will hold a 30 per cent interest. Located about 500 kilometres south-east of Darwin, the permits cover an area of more than 18,500 km² within the Beetaloo Basin, which is highly prospective for shale gas and associated liquids.

The farm-in provides Origin a significant unconventional exploration position in one of the Northern Territory's most prospective onshore basins. Previous exploration activities within the Beetaloo Basin, including drilling activity on the permits, has highlighted its strong shale gas potential.

The agreement is subject to certain conditions precedent including regulatory and other relevant consents and approvals. Origin will acquire and fund Sasol's farm-in interest if the latter does not obtain required regulatory approval.

Origin experience with hydraulic fracturing

Fracture stimulation has been used for over 60 years internationally and for over 40 years in Australia. Fracture stimulation enables a more effective release of gas from unconventional or low permeability reservoirs and is critical to the economic development of otherwise uneconomic hydrocarbon resources.

In the past 20 years fracture stimulation has proved to be particularly successful in maximizing the commercial potential of gas from unconventional gas resources such as shale gas and CSG.

The growing CSG industry in Queensland has recently led to significant focus on this extraction technique from environmental groups, some of whom do not support the use of gas as a transition energy source replacing coal for electricity generation purposes. Regrettably this has led to a campaign of misinformation and, in some cases, extreme claims that have unnecessarily raised concerns amongst communities where unconventional gas development is planned.

In Queensland the Government has introduced strict regulatory requirements covering the fracture stimulation process and the additives used in stimulation fluids. The guidelines have been developed in consultation with industry and Origin has actively supported this process both through APPEA and as an operator in its own right.

As the Upstream operator of the Australia Pacific LNG Project, Origin has stimulated 135 wells out of a total of 1289 active wells (as of 31 March 2014.)

Minimising water use and recycling where possible

Whilst not in the context of shale gas, Origin (as Upstream operator of the Australia Pacific LNG Project) has developed expertise in water technology and processes through its CSG water treatment facilities to enable recycling of water for stimulation fluids (if suitable) when it progresses into the development phase of a project.

Origin's work has been able to demonstrate the applicability of managing water resources and the re-use of water for fracture stimulation in its CSG business. Whilst the technical aspects of the CSG business differ from those for shale gas extraction (for example, treatment of waste stimulation fluids as compared to treatment of CSG water), the technology, processes and knowledge developed in relation to the CSG industry may have relevant application to the shale gas industry.

Building Trust with Communities

Origin supports APPEA's view that early and effective communication with stakeholders contributes to the development of public confidence in the use of hydraulic fracturing.

To that end, Origin, as Upstream operator of the Australia Pacific LNG Project, has undertaken, and continues to undertake, a number of community engagement activities aimed at improving understanding and acceptance of hydraulic fracturing. A summary of various activities is below.

Using a core section to inform and educate about drilling and stimulation techniques and groundwater impacts

A core sample of 1,500 metres of drilled rock from the Surat Basin was taken on a road show to regional Queensland, Brisbane and Canberra in 2011.

Recovered by the drilling team for the Australia Pacific LNG Project, it was the first time that a core of this length had been gathered for the purposes of providing knowledge about subsurface conditions and how gas development can be undertaken in a safe manner while protecting valuable ground water resources.

The core display showed underground rock formations including the sandstone layers known as aquifers, from which water is typically accessed for agricultural and stock use; the underground coal formations, where the unconventional gas resource is present; and the dense mud and silt stone layers known as aquitards that separate and limit the movement of groundwater between the various layers and also act as a impermeable barrier between the groundwater and stimulation activities.

This road show attracted interest from the community, landholders, environment and industry groups, media, government representatives (federal, state and local) and Origin investors.

Stimulation fluid demonstration and web-based information

As part of the Australia Pacific LNG Project, an interactive briefing session which incorporates the preparation of sample stimulation fluids has been developed to 'demystify' the process. The presentation assumes no knowledge of the process and allows people to handle and observe components used to prepare the fluids. The presentation is regularly used for engaging regulators, politicians and community members.

A webisode which details the fracture stimulation process was prepared as part of the materials developed for the Australia Pacific LNG Project website:

<http://www.aplng.com.au/darren-lockyers-journey>

Support materials, including fact sheets, have also been developed to assist with informing and educating people about fracture stimulation.

Field-based familiarisation tours


Origin regularly hosts in-field familiarisation tours in Queensland to educate and inform key stakeholders about its operations. In 2013 Origin hosted a party of 26 scientists from NICNAS, the CSIRO, Geoscience Australia, the then SEWPAC and the Office of Water Safety on a two day field trip with a particular focus on hydraulic fracturing and groundwater management. The visit included an inspection of a hydraulic fracturing operation and detailed discussion of the process with drilling representatives.

Public confidence in unconventional gas development can only be gained when the community develops a better understanding of the processes used and the significant technical and regulatory requirements that apply to the industry.

Further information

As mentioned earlier Origin would appreciate the opportunity to share its knowledge with you and your team. I would also like to invite you to participate in a field trip to our Queensland-based operations if appropriate. Please contact me on 07 3028 3456 to discuss.

Yours sincerely,



Martin Riley

General Manager - Asset Development