

Dr. Michael C. Clarke, CPEng., F.I.E.Aust., F.Aus.I.M.M., RPEQ.
Consulting Engineer, Resource Management & Infrastructure Development

Dr Allan Hawke AC
Commissioner
Northern Territory Hydraulic Fracturing Inquiry

GPO Box 4396, Darwin NT 0801
Tel: (08) 8999 6315 Email: HydraulicFracturing.Inquiry@nt.gov.au

Dear Dr Hawke,

Thank you for the opportunity to make a personal submission to the Northern Territory Hydraulic Fracturing Inquiry. I do so as a technocrat and a citizen who is passionate about the maintenance of energy security in Australia and indeed the world.

I believe that multi stage fraccing and associated drilling operations open a new Second Petroleum Era, in that the prospects of the world running out of liquid transport fuels plus gas for industry and society have been removed; we may truly be approaching the fact of 'energy for all', which is one of the goals of the Asian Development Bank, an organisation that I have recently consulted to.

Although the Territory has considerable coal resources, so far that coal has not been associated with recoverable coal seam gas (CSG). There are however many prospective sedimentary basins that have high potential for unconventional gas and oil discoveries and recovery. In short, the NT could become a major world petroleum source.

For the Territory, fraccing has the potential to make many existing gas and oil shows more productive and thus economically very viable. As to reworking such resources as the central Australian oil and gas fields, conventional field-life extension with fraccing of associated strata with non-conventional potential, may bring those fields back into substantial production, and could make the Amadeus Basin, for instance, one of Australia's premier petroleum production regions.

The question now must be asked, 'does the Territory want involvement in this potential energy resource?' The first environmental question thus becomes, 'does the Territory want the development of a relatively low carbon fuel resource?' If the answer is No on No, then the fraccing question is not required to be answered.

Defining fraccing and its applications:

1. Fraccing is not a new technology, it has been regularly employed since the late 1940s for increasing petroleum flows from oil and gas wells, and is utilised on both conventional and unconventional (that being CSG, tight geological formations and shale) petroleum recovery,
2. Fraccing is now used in 50 – 60% of CSG boreholes, where the coal structure is opened up to allow for the migration of gas out of the coal – however CSG production is not relevant to the Northern Territory at this stage,
3. Fraccing can be used on 'tight' petroleum strata, such as sandstones and limestones with low permeability, and

4. Fracking can be used to liberate gas and oil from shale with high Total Organic Content (TOC), say >2% TOC.

Each of the above applications of fracking and associated drilling technologies requires environmental guidelines, rules and controls applicable to the specific circumstance.

Environmental Impacts and Threats (including Water Use, Management and Clean-up),

The major concern that has been put forward as an immediate environmental factor is spent fracking water management. This has been overplayed, since fracking is not an ongoing activity during gas and oil production, but is limited to the well development phase, a over relatively short time period.

For brownfield and greenfield sites, the spacing of fraced wells (either horizontal and/or vertical) will be dependent on the stratigraphy, and the dimensions and the quality of the resource, with sequential sharing of the well development infrastructure and indeed the recycled fracking fluids being an operational feature. For brownfield sites sharing/reuse of existing off-take infrastructure (pipelines, valves, pumps and compressors etc as well as roads and access) will continue as an operational activity until production is stopped and the site is rehabilitated.

The Inquiry lists ‘sound’ as a factor, however sound is unlikely to be an issue in remote Australia. Seismic activity is however possible from fracking as has been noted by the UK and French governments. The seismic activity from fracking is generally very weak and does not increase the natural seismic propensity – note, the central NT has significant intra-plate seismic activity with quakes being recorded over 7 on the Richter Scale. These quakes originate at much greater depths than ‘fracking depths’ and thus the two causes of seismic activity are rarely related.

Environmental Mitigation,

The water question has been largely resolved with mitigation measures including:

- The increasing use of only non-harmful fracking chemicals and the recovery of those chemicals on fluid that flows back to the surface,
- The ability to utilise saline water in fracking, and where recovered produce a potable or agricultural water from the spent fluids,
- The recovery of residuals from spent fluids including propants and chemicals, and the recycling of those materials,
- The use of appropriate well liners to form a lasting seal with upper aquifers, and
- Good housekeeping of all fluids.

Seismic activity mitigation is achieved by not fracking under populated area and in the regions, informing communities when fracking is about to occur.

The use of Single or Multiple Well Pads, and

Multiple well pads are very useful where horizontal fracking is being planned. The technique can access very large volumes of highly prospective strata with high TOCs, especially where the target strata are extensive in area but not thick. Where very thick gas bearing strata is encountered, then vertical multi-stage fracking is more appropriate; this has been successfully practiced in South Australia by SANTOS on the Moomba 191 and 194 shale-gas wells. (In a brownfield site such as Moomba, use can be made of existing off-take infrastructure, as mentioned above.)

Site Rehabilitation.

The exploration and fracking phases of well developments are periods of frantic effort with large amounts of temporary infrastructure being installed around a drilling pad. Once the fracking is complete, spent fracking fluids removed and processed, and the well goes into production, then very little infrastructure remains in, on and around the site. The site can be rehabilitated during the production period, with only a small amount of plant removal and rehabilitation being required on the final well shut-down, in say five to fifteen years.

In areas of conventional exploitation that are being reworked as unconventional plays, the reworking offers the chance to have rehabilitation brought up to the latest standards, this being very useful in brownfield site management. It is suggested that future regulations reflect on whether a site is brownfield or greenfield, take into account the existing state of the site, and that appropriate regulations and operating rules be created by the petroleum authorities (the petroleum inspectorate) for each gas/oilfield.

Other

The development of fracking is democratising the World's energy supply (essentially spreading the sources of gas supply) and increasing international energy security and thus promoting environmental well-being, plus industrial and future human development.

Promoting the regional utilisation of discovered gas (and oil), for example the re-birthing of a Sweetwater type gas-to-liquids (GTL) project in Darwin or elsewhere in the NT, could see the Territory become a source of energy (and fuels) security for Australia. The rapidly changing world gas supply situation, with looming over-supply could see Australia with a surplus, a surplus that does not have a market as LNG. GTL for both domestic and export could be the answer.

To be able to become a world class resource in gas and associated natural gas liquids (NGLs) the NT must allow fracking. Those practicing fracking must have access to industry-best-practice technology (both onshore and offshore) and must quickly become a source of knowledge and expertise with respect to indigenous fracking technologies, practices and applications.

With regards,

Dr. Mike Clarke

Declaration of Interests:

1. I, Mike Clarke, am an engineer who has consulted in the coal, gas, oil and nuclear energy industries,
2. I have been a consultant to Central Petroleum, Australian Pacific Coal, BMC and the Asian Development Bank with respect to fuels and energy, and
3. I hold 60,000 Central Petroleum shares that I purchased on the market.

Author's permission granted to cite name on publication.