



Centrefarm Submission to the NT Hydraulic Fracturing Inquiry

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Introduction

Centrefarm Aboriginal Horticulture Limited is an Aboriginal-owned not-for-profit Australian company limited by guarantee. It was established by Aboriginal landowners in Central Australia to drive the economic development of Aboriginal land for the benefit of the Traditional Owners. Originally this was conceived as horticultural-based, but since incorporation in 2002 the company's services have expanded to include all aspects of economic development consultancy, and Centrefarm has become a key player in this arena, bringing together a range of skills and knowledge across disciplines as varied as agronomy, civil engineering, anthropology and business.

Centrefarm is an independent not-for-profit Aboriginal company charged with the commercial economic development of Aboriginal land in the NT for the benefit of the Traditional Owners (TOs). Centrefarm operates as an economic development consultant and land developer for Aboriginal people, utilising a small team of professional and experienced staff complemented by a range of professional associates. The company is able to provide consultancy services across a range of industries but retains a land-based focus, with specific expertise in the development of green-field land for primary industries. Centrefarm operates with the imprimatur of the two major NT land councils, whose respective CEOs sit on the Centrefarm board. Centrefarm emerged in the CLC region and operates under the trading name TopEndfarm in the NLC region.

Centrefarm's role is to identify commercially viable opportunities that provide the foundations for new regional economies and support the generation of jobs. The focus is on economic rather than community development. Based in Alice Springs, Centrefarm now operates across the Northern Territory and into Western Australia, and has received requests for its services from other states.

Centrefarm's subsidiary company, Centreprise, offers engineering, groundwater investigation, water infrastructure development, mapping and project management services to Aboriginal organisations, governments and industry. As such, Centreprise has in-house hydrogeological expertise and is therefore in a good position to advise on the potential effects of the unconventional gas industry on groundwater resources in the NT.

Centrefarm horticultural operations and interests across the NT are at two levels:

1. Direct ownership and management

- i) Ti Tree Water Control District:
 - 25% equity in TTG Nominees Pty Ltd, 2600ha, freehold located 40km SE of Ti Tree township within the Pine Hill Horticultural precinct and holders of the 2000ML per annum Ground Water Extraction Licence
 - 33% equity in Territory Horticulture Farm Fund, farm operators of the above
 - Management agreement over Pine Hill 'B', NT Portion 6109, a 1000ha Greenfield land parcel with an annual entitlement of 1000ML per annum. This portion is currently a Crown Lease term convertible to Freehold that is held by the Ilkewartn Ywel Aboriginal

Corporation (IYAC). The grant of this Crown Lease term and the conversion to Freehold is to be at nil cost to IYAC

- 5 separate s19 leases negotiated within the NT Aboriginal Land Rights Act – 1976 (ALRA). These leases are held by Ahakeye Horticulture Pty Ltd (Ahakeye HPL), which is wholly owned by Ahakeye Farms Aboriginal Corporation (members are the Traditional Owners of Ahakeye Aboriginal land Trust) on which the 5 land parcels sit. Centrefarm has a Management agreement for the operations of Ahakeye HPL
- ii) Western Davenport Plains Water Control District:
- 3 separate s19 leases located on the Warrabri Aboriginal land trust on which the Ali Curung community sits. The leases were negotiated within the NT Aboriginal Land Rights Act – 1976. These leases are held by Alekerange Horticulture Pty Ltd (Alekerange HPL), which is jointly owned by Arlpwe Aboriginal Corporation (members are the Traditional Owners of Warrabri Aboriginal Land Trust) and Arlpwe Residents Aboriginal Corporation (members are residents of the Ali Curung community and are affected people under ALRA). Centrefarm has a Management agreement for the operations of Alekerange HPL
2. Via responsibility for identifying and developing potential sustainable agricultural projects across Both the Northern (TopEndfarm) and Central (Centrefarm) Land council regions
- i) ALRA land within the CLC and NLC regions proximate to all ground water resources not limited to and including (much of the Northern Territory's ground water is not in declared Water Control Districts):
- Alice Springs Water Control District (CLC region)
 - Daly Roper Water Control District (NLC region)
 - Darwin Rural Water Control District (NLC region)
 - Gove Water Control District (NLC region)
 - Great Artesian Basin Water Control District (CLC region)
 - Tennant Creek Water Control District (CLC region)

The viability of these horticultural operations both present and future are entirely dependent on the availability of the underlying groundwater resources.

It is well known that unconventional shale gas extraction is a water-intensive industry and yet petroleum activities are exempt from the need for licensing under the Water Act for extraction and use of surface water and groundwater. Centrefarm is deeply concerned that unregulated water take by the fracking industry could ultimately jeopardize their water resources and therefore the viability of these beneficial projects.

Centrefarm's activities and the Unconventional Shale Gas Industry in the NT

Centrefarm's primary concerns regarding the potential impacts of a burgeoning unconventional shale gas industry in the Northern Territory are as follows:

The impact of the high water demand of fracking operations on the groundwater resources critical to the operation of our horticultural projects.

It is well known that hydraulic fracturing operations are highly water intensive. A mean figure of 15 megalitre required per well was derived by Frogtech (2013). As an unconventional gas field would consist of probably thousands of wells, (each unconventional gas well releases only a fraction of the gas extracted by a conventional gas well, therefore a large number of wells is required to extract the same amount of gas), the amount of water required by the industry is enormous.

The high water demand of fracking will be a major problem in the NT because:

- Two thirds of the NT is arid or semi-arid with no surface water supplies; and,

- Potable groundwater is a limited resource in the arid-zone and therefore highly valuable. Once depleted or degraded by contamination, most arid-zone groundwater aquifers may not recharge in the modern climate.

Centrefarm understands that there will be circumstances whereby saline or non-potable groundwater resources can be used in the fracking process to avoid using potable resources. However, this may not always be possible or desirable for the following two reasons:

1. Due to the inherent spatial and temporal variabilities in the hydrogeology across the NT, in many regions (particularly in the monsoonal north) all local groundwater resources may be fresh/potable, *i.e. there may be no non-potable water resource alternative.*
2. Further, the extraction of water from a saline or brackish aquifer has the potential to affect adjacent or overlying freshwater aquifers and/or surface water resources (where there is connectivity). Extraction drives a change in pressure gradients (head) throughout the aquifer both vertically and horizontally which may extend to other aquifers and in some instances, water bodies. For instance, a drop in head in a saline aquifer due to extraction may induce freshwater ingress from either overlying aquifers or laterally adjacent aquifers, thereby affecting potable resources.

The risk of this occurring must be assessed on a site by site basis.

Therefore, the unconventional gas industries claim that the issue of affecting potable groundwater resources can be circumvented by accessing non-potable water resources instead may not always be true.

Contamination of aquifers and surface water environments utilised by Centrefarm projects

Centrefarm is concerned that fracking operations may result in contamination of those ground and surface water environments currently utilised by current operations, as well as resources which may be vital to future Centrefarm horticultural projects that have the potential to enhance Aboriginal development in the NT.

Contamination of aquifers and surface water may occur via the upward migration of methane, retained fracking fluids and saline produce water into fresh water resources via a number of pathways:

- Well failure - breaches in the cement well annulus (a common cause of well failure), leaky well casing, well infrastructure failing under injection pressure, degradation and corrosion of wells over time following well abandonment;
- Natural pathways such as geological structures like faults and fractures which may be generated by the fracturing event itself which is seismic in nature;
- Leakage or accidental spillage of contaminated fracking return wastewater from surface containment.

These failures have occurred in unconventional shale gas fields all over the world. For instance, a study from Alberta, Canada of more than 315,000 oil, gas and injection wells of various ages, (Watson and Bachu, 2009), found that around 5% of wells were leaking.

Another well-documented example of groundwater contamination caused by fracking operations from the USA occurred in Pennsylvania, USA (Osborn et al, 2011). This study found that about 75% of wells sampled within 1 kilometre of gas drilling in the Marcellus shale in Pennsylvania were contaminated with methane from the deep shale formations.

More locally, groundwater was found to be contaminated recently due to leakage from a surface coal seam gas wastewater storage pond in northern NSW at the Bibblewindi Water Treatment Plant in the Pilliga. Routine groundwater sampling revealed elevated levels of naturally occurring elements including arsenic, lead, and uranium. (<http://www.miningaustralia.com.au/news/santos-csg-project-contaminates-groundwater>)

The industry claim that there have been no reported cases of groundwater contamination, that could be an artefact of the reality that a) no one is looking for groundwater contamination (detection is usually incidental and already deleterious by the time it is detected), and, b) groundwater moves slowly, and it may take decades or even centuries for contamination to be detected. As the fracking industry is relatively new to Australia, and indeed to the NT, the lack of reported contamination incidences does not support the argument that the fracking industry in the NT has been impact free.

In addition to the above risks, our understanding of groundwater systems, particularly deeper ones, is very limited in the NT. It is hard to evaluate impacts without data and understanding of the nature of deep aquifers.

It appears to Centrefarm that the highly generalised assurances of no-impact-to-water-resources submitted by the fracking industry (see the public inquiry submissions of Santos, Armour Energy, Imperial Gas etc (http://www.hydraulicfracturinginquiry.nt.gov.au/public_submissions.html) are not supported by a detailed knowledge of the hydrogeological environment of the NT, or a robust evidence base. For instance, groundwater in the NT is of a corrosive nature in many areas such as the Great Artesian Basin, where 50 year old abandoned oil wells have completely corroded away resulting in inter-aquifer contamination.

Moreover, because intense development in most shale gas plays has been taking place globally for less than 20 years, questions about the longer-term cumulative effects cannot yet be answered (Canadian Council of Academies, 2013).

For these reasons, Centrefarm is concerned about the adequacy of the current regulatory environment to deal with this burgeoning, large scale industry. Clearly, the current regulatory framework has not prevented the escape of contaminated waters from numerous sites including Mount Todd Gold Mine, Ranger Uranium Mine or Redbank Copper Mine. The Montara Well oil spill in 2009 in the Timor Sea is further evidence that the NT regulatory regime has failed to protect the water environments of the NT. Based on this evidence, Centrefarm believes that the regulatory environment of the NT needs to be upgraded to provide adequate protection to the water users of the NT. Further, the capacity of the NT government to independently assess risk on a site-by-site basis needs to be upgraded and adequately resourced.

Recommendations

The unconventional shale gas industry and its activities within the NT will require careful management to prevent unintended consequences to natural resources, human health, economic development, and to mitigate the risk of long-term environmental damage.

Centrefarm would like to submit the following recommendations to the Inquiry as a means of protecting the resources upon which its projects and the flow-on benefits rely.

- **Recommendation 1:** *The NT Government must construct a stronger, more effective, well resourced regulatory and enforcement framework tailored specifically at detecting and preventing adverse impacts to NT water resources from the unconventional shale gas industry. For instance, water take by the hydrocarbon industry should become regulated under the Water Act.*
- **Recommendation 2:** *NT Government must boost its capacity to assess and evaluate impacts and risks to the water resources of the NT.*
- **Recommendation 3:** *Proposed unconventional gas fields must be assessed for environmental risk on a site by site basis due to the high local and regional variability of the groundwater environment in the NT.*
- **Recommendation 4:** *The government should consider establishing exclusion zones around 'high value' aquifers – this would require extensive studies and modelling to determine the 'zone of influence' and impacts around take areas.*
- **Recommendation 5:** *Centrefarm and the horticultural industry should be consulted in the development of the regulatory and management framework for the fracking industry.*

References

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