To the Parliamentary Inquiry into Unconventional Gas Mining in Victoria -

My name is Wendy Klason and I live on a wilderness acreage near Seaspray. My home is in close proximity to Lakes Oil’s Wombat field; Wombat 3 well being approximately 700 metres from my home. I have lived on this property since the early 1980s. During this time I have farmed, raised my two children, gardened, studied the diverse ecosystem, been an active community member, completed a Postgraduate Diploma in Psychology, qualified as a grief and bereavement counsellor, and worked in this field. My property is currently a place where individuals and groups visit in order to be in pristine nature, to learn about the ecosystems here, and for respite and healing.

Oil and gas exploration has been a part of the history of the property for over 60 years, however it was Lakes Oil’s approach, in the early 2000s, to explore for tight gas which has been most concerning. With my background in physics, and teaching, I have been committed to educating myself and my community about the risks to environment, health, and our economy, posed by the unconventional gas industry, since 2012, when they became apparent to me.

In this submission I will focus only on three aspects relating to part two of the terms of reference directly.

(2) the environmental, land productivity and public health risks, risk mitigations and residual risks of onshore unconventional gas activities;

A. The significance of Farrell Wetland located within the Wombat field
Farrell Wetland, commonly known as Farrell Swamp is located in the Seaspray area, adjacent to Lakes Oil's Wombat field. It is 10 kilometres WNW of Lake Reeve (western tip at Seaspray), and so adjacent to the Gippsland Lakes System.
Historically, a thriving wetland, with water-level variable, but typically one metre deep. When I first moved to live next door to Farrell Wetland in the early 1980s, it was the frequent home of many waterbirds, including ducks, and sometimes black swans; wombats, wallabies, koalas, emus and other native animals were generally to be seen near its shores. This bushland is also home to Lace Monitors (goannas), which are threatened by habitat loss, and disturbance of their habitats (see http://www.softschools.com/facts/animals/goanna_facts/326/)

Farrell Wetland dried up in the drought of the 1990s and early 2000s. Despite many years without drought, Farrell Wetland has not refilled. This may possibly have been caused by a lowering of the water table, which sometimes results from the de-pressurising associated with offshore gas/oil production. Lower water tables have affected local farmers (Yarram area), who have needed to drill deeper and deeper water bores. It has also been speculated whether onshore exploration activities might have also contributed to disturbance of underground water systems. Moreover, it is of vital concern that continued exploration drilling and possible onshore production may pose significant risks to this and other wetlands.

Currently,

Farrell Wetland is a huge, dry peat lake, approximately 32 hectares in area. It is flanked by Dry Sclerophyll Forest (Banksia Heathland). Whilst Lakes Oil holds title to most of the land Farrell Wetland is on, a small part is publicly owned land.
It has been suggested that the most valuable contribution to wildlife habitat protection is preservation of wildlife corridors criss-crossing our country. Farrells is part of a crucial existing corridor from Mullundung State Forest to Bass Strait; a significant bushland remnant in our locality.

Close proximity (potentially as little as a few hundred metres for the proposed Wombat 5) of gas wells to an extremely large peat lake presents an unacceptably enormous fire risk. In 2010 a flare from Wombat 2, about 1km East of Farrell Wetland, set fire to a paddock, burning 10 hectares of vegetation and some pine trees. Lakes Oil had not been adequately equipped for this occurrence, and the attendance of CFA units were required to prevent the fire spreading to bushland, pine plantations and my home. Wombat 2 is 1km East of Farrells with a pine plantation and a large tract of bush in between. It is well documented that gas well operations present fire risk. It is also a common experience in our area that fires in peat are almost impossible to extinguish, creating ongoing severe air pollution, with consequent dire health effects for humans and animals, including native fauna. Should another fire occur and the peat in Farrell Wetland be ignited, we may face effects similar to those from the Morwell mine fire of 2014; and extensive loss of the surrounding bushland.

**B. Independent audit requested of integrity of cementing of existing gas and oil wells**

Many concerns have been raised about the integrity of the cement sheaths used around well casings. Cement is used to provide stabilisation and support for the casing, and importantly, to provide zonal isolation and so prevent fluid migration between subsurface formations [http://petrowiki.org/Cementing_operations](http://petrowiki.org/Cementing_operations). The longterm integrity of the cement sheath is crucial - it must prevent the leaching into aquifers of any toxic substances (e.g. heavy metals, naturally occurring radioactive materials - NORMs) from other strata, or chemicals included in fracking fluid, or those produced when fracking fluid interacts with naturally occurring substances. The cement surrounding well casings MUST maintain its strength and impermeability FOREVER.

The literature indicates that cementation is the most crucial aspect of a wellbore completion. The long term integrity of wellbores relies upon cements being able to withstand the maximum loads incurred. These are commonly caused by excessive pressure or temperature changes, for example, the changes in formation pressure induced by subsidence or changes with movement with ongoing seismic shifts. If the cement fails, the consequent loss of zonal isolation can result in increased risk of water production, premature well abandonment, and loss of revenue. “Even worse are the risks for the environment and human health due to the possible contamination of fresh water levels, pressure supercharging of shallow sand bodies and blow outs” (p.1). If failures occur after installation, the repairs necessitate highly technical and costly efforts (Teodoriu et al, 2010). *Investigations on Casing-Cement interaction with application to Gas and CO2 Storage Wells.*
A presentation by Physicians, Scientists, and Engineers for Healthy Energy (PSE) reports that loss of wellbore integrity is a well-understood and chronic problem. It includes a graph of “Industry-Reported Data On Loss of Wellbore Integrity: Offshore Wells” which indicates that: a) About 5% of wells fail soon. b) More fail with age. c) Most fail by maturity. This document concludes that there is a pressing need for scientific investigation of possible links between leaking gas wells and water well contamination. (Wellbore Integrity: Failure Mechanisms, Historical Record, and Rate Analysis. http://www2.epa.gov/sites/production/files/documents/ingraffea.pdf)

See the 2012 article Wellbore integrity and cement failure at HPHT conditions for a more detailed understanding of the potential risks of wellbore failure, particularly in mature wells, and why these risks are much greater than the projected risks, for example, uncertainties due to unknown production parameters. (International Journal of Engineering and Applied Sciences. 2012. http://www.eaas-journal.org/survey/userfiles/files/Petroleum%20Engineering%20%201_Revised-Corrected.pdf)

If the Victorian Government is to approve any further drilling operations, the citizens it represents need rigorous scientific studies that provide sufficient evidence to reassure them these installations will be safe over time. With over 50 years of oil and gas exploration and production in Bass Strait, industry monitoring of the performance of cement sheaths around their well casings should provide a plethora of quantitative data. This presents a golden opportunity to collect and analyse such data.

I request that an outside audit is undertaken of the historical structural integrity of cementing of all well casings in Victoria. This would involve an independent scientific body accessing the industry’s monitoring records, to verify the stability and safety of their existing wells over time. It is imperative that such an audit is undertaken by our elected government. This will determine the veracity of the industry’s claims regarding high levels of security being afforded by the durability of well casings protections, in future operations.

General comments
I am also strongly opposed to onshore gas mining, because I support community rights to self-determination. More than 50 communities around Victoria have conducted comprehensive surveys of landholders and residents and consistently found strong opposition to gas mining, with results as high as 99% of residents opposing the development of a gas industry. If these results are ignored, the entire edifice of Parliamentary democracy is at risk.
I oppose all forms of unconventional gas mining, both onshore and offshore, be it in from a coal seam, a layer of shale or sandstone, or any other geological structure. I recommend to the Parliament a complete and permanent ban against all onshore gas mining, and a complete ban against the use of any unconventional gas mining techniques, including but not limited to: hydraulic fracturing; horizontal drilling; and underground gasification or liquefaction processes. This ban should include all types of onshore gas resources, regardless of the geological structure in which they are found, and regardless of whether they are currently administered by the Petroleum Act or the Minerals Act.

I would like to thank the Inquiry for taking the time to read my submission.

Yours sincerely,
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