



**Submission to Standing Committee on Environment and Public Affairs.
In Reference to Petition No 155 – Hydraulic Fracturing for Unconventional Gas.**

Recent advancements in technology used for drilling and stimulation of petroleum reservoirs including directional/horizontal drilling and extreme pressure, high volume hydraulic fracturing has led to accessibility of 'unconventional' petroleum reserves. Unconventional petroleum reserves typically refer to gas and oil trapped within 'tight' sandstone formations, shale rock or coal formations.

Until now, Petroleum exploration and production consisted of finding accumulations of petroleum within permeable sandstones, drilling into the targeted area and liberating the gas/oil from that accumulation. It should be noted that as these conventional wells production rates declined, hydraulic fracturing was sometimes used to stimulate flow.

It should also be noted however. The high permeability of formations in which conventional petroleum exists allowed these reservoirs to be fractured with relatively low volumes of fluid and low pressures. Horizontal drilling was also generally not required. Today, to access unconventional gas and oil, the petroleum industry drills horizontal wells with up to 2km lateral length, tens of millions of litres of water, hundreds of tons of chemical additives, and pressures of up to and beyond 15,000psi to fracture shales, tight sandstones and coal beds.

Unconventional gas exploration and production can be referred to if you like – a Landscape Scale Petroleum Industry. As described above, conventional petroleum production consisted of liberating petroleum from trapped accumulations of oil/gas.

Petroleum bearing shales, tight sandstones and coal beds however, exist across the entire extent of sedimentary basins. This leads to petroleum exploration and production activities existing over hundreds/thousands of square kilometres of landscape.

A sedimentary basin such as the Kimberley's Canning Basin or the Midwest Coastal regions Perth Basin in full production will require thousands of wells, thousands of access roads, thousands of pipelines, hundreds – thousands of condensate (light oil) separators and storage facilities, hundreds of compressor stations, tens/hundreds of central processing facilities, workers camps, light towers, equipment storage compounds, tens/hundreds of operating drilling rigs, explosive storage facilities, chemical storage facilities, drilling tailings storage, large volume used fracturing fluid storage etc.

Unconventional petroleum exploration and production, requires an 'economy of scale' in order to become economically viable. Flow rates of unconventional gas/oil wells generally decline extremely rapidly, meaning the industry requires constant drilling and hydraulic fracturing to continue at a very rapid rate to continue positive economic returns from the continuous requirement of capital expenditure.

This fact alone is a key reason why a moratorium is required in Western Australia. As **the speed and scale of this industry's growth exceeds the speed and scale in which government and industry regulators can respond to an expansion of operations** whilst still undertaking regulation and oversight of the industry. Especially as current regulatory systems are absolutely unable to cope with the burden of current mining and petroleum activities in Western Australia.

Complete bioregional assessments, starting with the Southwest and Northwest are required in Western Australia prior to the development of the unconventional petroleum industry.

Scope of assessments shall include a focus on all potential impacts of unconventional petroleum operations on the Western Australian environment, biodiversity, human health, existing land uses, future natural resource requirements (water etc.) for expanded populations. land rights, cultural and social impacts, industrialisation of public and private lands.

Also, what impact will this industry have on Western Australia's ability to capitalise on and transition toward exploitation of easily accessible, sustainable renewable energy to provide domestic energy security and price stability in the short to medium term.

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The threat of landscape scale unconventional petroleum exploration and production in Western Australia requires the **Western Australian government to act swiftly and decisively** to ensure that if the industry we're to be allowed to operate on the people of Western Australia's private and public lands, it can be assured that the government, industry, and regulators know exactly **where and if this industry can operate in Western Australia** without

1. Contaminating underground water supplies with gases from petroleum bearing formations, drilling/fracturing fluids etc. from either wells and or pre-existing geological features such as faults, fissures, stress zones etc.
2. Contaminating soils and surface water
3. Affecting availability of private lands for food production
4. Affecting biodiversity through activities such as land clearing, fragmentation of remnant bushland, spread of soil pathogens, contamination of land surface, air emissions, light/noise pollution, loss of natural surface expression of aquifers (mound springs – wetlands etc)
5. Loss of access to sustainable levels of extraction of underground water resources for current agricultural use, public use and future populations water requirements, without compromise of environmental requirements.
6. Affecting human health, farm produce/stock health or native fauna/ flora health from air emissions light/noise pollution from drilling, hydraulic fracturing, production, processing and other industry activities in proximity to farming and pastoral land, townships, dwellings, communities, bushland etc.
7. Affecting social fabric of regional Western Australia.

Existing in Western Australia is a long standing discussion regarding sustainable groundwater extraction, future water requirements for both human consumption/use, stock use and long term environmental requirements. To date however, **there is still either a lack of data, or no data to enable planning of Western Australia's future with sustainable use of groundwater in mind.**

The only undisputable science surrounding groundwater in Western Australia is that we are over extracting currently accessed groundwater, recharge rates of all aquifers in Western Australia is either slowing or unknown and it is a fact that climatic change will lead to an exacerbation of this. It would be seen as criminal by the people of Western Australia if the government of Western Australia we're not to move swiftly to halt exploration and

In light of this, It can be argued that complete bioregional assessments in Western with a focus on water are required to be undertaken as a matter of urgency regardless of whether unconventional petroleum exploration and production activities exist or not. However, It would be wise to disallow new extractive industries to begin prior to assessment of the compatibility of the landscape to accept new extractive industries.

In signing onto the petition to support a moratorium on unconventional petroleum operations in Western Australia, the people of Western Australia – with an emphasis of those in regional areas have asked of the Government of Western Australia not so much as to ban completely some aspects of petroleum exploration and production, but to halt exploration and production activities until it can be proven that the concerns outlined in petition No 155 are dealt with, to prove if and where development can occur. This shall not be viewed as a hindrance to economic development of the state or to workings of the government. **It shall be viewed as a fundamental requirement of the Government of Western Australia's service to the future health and wellbeing of the people of Western Australia.** A government whom does not act to ensure the future health, natural wealth and wellbeing of its peoples simply does not fulfil the fundamental requirements of a democracy.

Kindest Regards

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