Submission to the Victorian Parliament's Environment and Planning Committee's Inquiry into Unconventional Gas in Victoria

We are writing in response to the request for community views on unconventional gas mining in Victoria. We are retired but have worked and lived in Portland for the past 36 years. Originally we relocated from Melbourne to Portland on an 18 month contract with a multi-national company that had a decentralised division in Portland. Realising the benefits of living and raising a family in the country, we did a management buy-out of the factory and ran it successfully for 27 years until retiring nine years ago. We have many friends in the area now and, like us, they appreciate living in a town set amongst green pastures and fertile agricultural lands.

Our submission largely concentrates on the potential risk of the contamination of water resources in south western Victoria and the devastating effects on the economy and liveability of this area. Although our objections are centred on the Glenelg Shire and surrounding areas in the Western district, the arguments can apply equally to other areas of Victoria. We are strongly opposed to fracking anywhere in Victoria and wish to see it banned.

(1) The prospectivity of Victoria's geology for commercial sources of onshore unconventional gas;

We do not believe there is any up-side to the exploration and mining of unconventional gas in the Glenelg and surrounding areas. The only"up-sides" that could possibly be raised are Cheaper and plentiful supply of gas and Revenue to the government from royalties and taxes from the Mining Companies and employment possibilities. We believe that the unconventional mining of gas reserves now will make a small amount of money for the government (especially now that the Carbon Mining Tax has been removed), and a lot of money for a few mining companies who will happily export the money and greedily export the gas, thus depleting the reserves for Australia. Statistics show that gas from a fracked well stops flowing in less than three years. We wonder what our children, never mind our grandchildren, will use when the supplies of gas have run out. There is no prospect of gas being replaced by any other energy source in the near future. Mining unconventional gas now will not lower gas prices for Australians but instead experience shows that competition from the export market will drive up the price for domestic use.
We believe this gas should be retained for the future of Australians when current conventionally mined supplies have run out, and greatly improved technology can ensure the process does not do the irrevocable damage it does now.
Regarding employment possibilites, and thus tax to the government and benefits to the local community, the experience at other unconventional gas sites is that large drilling companies prefer to import their teams of workers who have the expertise to use the large heavy equipment rather than to train locals to do the work. The imported labour takes over the local area not putting long term on-going money into the community as locals do, and causes disruption by being prepared to pay excessive amounts of money for their immediate needs such as accommodation. Once the gas fields infrastructure and drilling have been completed, the "fly in, fly out" workers depart back to their own communities leaving only a small permanent workforce in place to run the gasfields, and leaving desolate areas of land no longer fit for agricultural, horticultural and farming use.

With increased stress on cities, the Victorian (and Federal) Government should be encouraging more people to de-centralise permanently to rural communities. With the environment destroyed and looking like an industrial wasteland, no one will want to live "on the land". Rather than increase the population in rural towns, unconventional mining will decrease the attraction of living there, forcing cities to wear the burden of over-population.

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

Potential and residual risks of unconventional gas mining on the physical environment include earth tremors and quakes and salinated and/or poisoned wastelands where crops can no longer grow, farmed and native animals such as kangaroos and emus can no longer graze, and people no longer want or are able to live.

There are many well documented health risks to people living and working near unconventional gas fields, however our greatest concern is the potential risk to the water supply - ground and surface water and aquifers - caused by the unconventional gas production methods:

Ground and surface water supply:

Part of the unconventional gas mining process is to use settling and evaporation ponds to deposit the 'produced' water when it re-emerges with the gas after the pumping activity. This contaminated water may contain chemicals such as BTEX which naturally occur deep underground (their use is currently banned in Victoria). As a result of fracking, heavy metals such as arsenic, lead and mercury can also be found in 'produced water'. Even if the settling and evaporation ponds are securely contained they are open to the sky and heavy rain can cause run-off into the surrounding area and absorption into the ground. Not only can this affect ground and surface water catchments but in the Western District there are many "orphan" bores historically drilled to access water. Many of these are not documented so that, although known bores are regulated and capped when they are no longer used, these "orphan" bores remain open and they provide a direct route down to the water aquifer below. Contaminated ground and surface water can find its way into the aquifers via these "orphan" bores which are undocumented but dotted throughout the Western District of Victoria and most probably other rural areas in Victoria.
A toxic sludge remains after the settling and evaporation ponds process which is covered over and left rather than being excavated and disposed of correctly. This toxic sludge can over time leach into the ground dispersing and poisoning the locality. According to the National Toxics Network:"the fracking process itself can release BTEX (Benzene, Toluene, Ethylbenzene, Xylene) from the natural-gas reservoirs, which may allow them to disperse into the ground water aquifers or to volatise into air."

The Dilwyn Aquifer and the Report of the Society of Petroleum Engineers

The Dilwyn Aquifer is a large underground water source which stretches across much of south-eastern South Australia and south-west Victoria.

Locations in south western Victoria where mining companies seek to explore, and in fact where some have already been given licence to explore, are situated over the Dilwyn aquifer. The gas seams they are looking to exploit are Tight and Shale gas seams which require the process of Fracking for extraction of the gas.
Fracking involves first drilling extremely deep vertical bores followed by horizontal ones, then pumping a mixture of water, sand and chemicals down into the Tight or Shale seams to release the gas. Some of the chemicals used in this process have serious health risks for humans and animals. Contamination of the Dilwyn aquifer as the result of a faulty bore would affect the availability of clean drinking water in south western Victoria. This is extremely disturbing when research by the Society of Petroleum Engineers in 2000 shows that 5% of all bores will have immediate gas leakage and all will eventually leak. This same technology is still used in unconventional (and conventional) gas mining today. Mining companies argue that the fracked material is securely contained by the steel casing surrounded by a cement sheath; but evidence shows this is not true. The vertical bore pipes are surrounded their entire length by a cement grout barrier against the rock. The bores can be over four kilometres deep and there is no way to observe the outside of these casings. According to the Engineer's report, it is the cement casing on the outside that shrinks and breaks down far underground causing gaps between the damaged casing and the strata through which the bore passes. This allows liquids and gas under great pressure to be pushed along the outside of the casing, passing through and traversing the more porous strata and bringing contaminants and impurities to the once naturally sealed and protected layers such as the Dilwyn Aquifer. One slightly damaged casing will continue to fail and will eventually allow the transference of "produced" water (with known chemical additives) and unknown contaminates (like heavy metals and noxious gases) released by the fracking process to move through successive layers and pollute any water aquifer in its path.

The real possibility of earth tremors and shakes as the result of the fracking process also serves to disrupt the different levels of strata with a high risk of contaminating the aquafer.

Wannon Water supplies 2,481.3 million litres of drinking water to customers in south western Victoria and much of its water comes from the Dilwyn Aquifer. The Dilwyn aquifer supplies the drinking water for Portland, Port Fairy, Heywood, Dartmoor, Port Campbell, Peterborough, Timboon and Paaratte. Other aquifers also supply drinking water to areas in the south west, for example, the Port Campbell Limestone aquifer supplies drinking water to Casterton, Coleraine, Sandford, Merino and Henty and the Newer Volcanic aquifer supplies drinking water to Caramut, Penshurst and Mortlake. Aquifers are found at different places and at different depths from the ground surface, but a faulty conrete sheath or steel casing in a bore drilled possibly five kilometres into the ground could result in the contamination of more than one aquifer and ruin much crucial drinking water, especially as there are known to be interconnections between some aquifers.

(3) the coexistence of onshore unconventional gas activities with existing land and water uses, including –
(b) the legal rights of property owners and the impact on property values.

It is well documented that property values around an unconventional gas site drop markedly: looking at real estate pages shows that a 50% drop in value in not unusual. The legal rights of property owners are undermined by the fact that the process of fracking involves vertical then horizontal drilling that can affect the property of neighbours. At present, if one property owner gives permission for exploration (and/or excavation) it will affect close neighbouring properties even if they themselves have said NO to the Mining companies. This situation must be untenable for the neighbouring properties and definitely should not be legally allowed to happen.

a) agricultural production and domestic and export market requirements;
c) any implications for local and regional development, investment and jobs

Employment opportunities would be lost with the demise of the agricultural, pastoral, and tourism industries which currently employ directly or indirectly thousands of local people, far more than would be temporarily employed even in the more labour-intensive initial phases of an unconventional gas mining project.

In the Glenelg and surrounding districts, some of the specific industries that directly depend on the health of the Dilwyn and other aquifers, and healthy ground and surface water are:

Timber: processed (wood chips) and unprocessed (logs)

Dairy: dairy processing is important to the region both for domestic consumption and in the production of milk powder for export markets.

Meat: abattoirs, boning rooms (cattle, sheep, pigs, etc.)
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Agriculture including horticulture and viticulture businesses, and indirect industry such as the large fertiliser plant based in portland

Ground water plays a vital role in sustaining agriculture in Victoria. Fracking is a very water intensive process with each initial frack using somewhere between two and four million gallons of water. The diverting of millions of litres for use in unconventional mining means less surface and ground water for the use of agriculture. Farmers always have to face the prospect of drought and the water that irrigates their land is precious and should not be so wastefully used.
Farmers, being more cash-strapped than mining companies, are likely to lose out in the competition for water between themselves and mining companies. Agriculture is vital to the South West economy: the total value of agriculture in the south-west region in 2013 was 2.3 billion. Agriculture, Forestry and Fishing together comprises approximately 20 percent of employment in the Glenelg Shire and this does not include necessary support industries, such as farm vehicle sales and repairs. (Glenelg website) Underground aquifers rather than ground and surface waters supply the

irrigation needs of the coastal areas in the south west with Southern Rural Water owning the infrastructure.

During the recent drought in the southern part of Australia that started in 2002 and lasted till the heavy rains in 2010, the south west of Victoria was still green and fertile. Desperate farmers from other Australian states as well as from areas north-east of the Glenelg shire transported or drove their stock into our still green, fertile areas to keep their animals alive. The main reason for this fortunate situation was the plentiful supply of clean, unpolluted bore water still available for the irrigation of land and the watering of livestock.

Conversely, if the water aquifers becomes polluted then the situation is dire for the many farms and agricultural businesses that are dependant on their bore water. It is short-sighted and ignorant to allow one of the most fertile and productive areas for food in Australia (an area that can exist and produce food even when the rest of southern Australia is in drout) to be threatened by short-term gain for a few who don't live in the area, and most likely don't even live in Victoria.

The Fishing Industry:

Water from the Dilwyn Aquifer eventually ends up in the sea near Portland. Commercial fishing is Portland's longest established industry and Portland supports Victoria's second largest fishing port. There is a growing demand for recreational fishing and the Glenelg Council at Portland has recently installed brand new facilities to cater for the influx of fishermen. If the Dilwyn Aquifer water table were to become contaminated, this water would eventually reach the sea at Portland and would destroy the habitat – krill, seaweed, little fishes etc. – that draw the larger fish to this area. Not only would the Commercial fishing fleet have to go further afield for their catch, but the newly developed Recreational fishing industry (with all the tourism and commercial benefits it brings to the coastal areas) would be destroyed. In 2010 according to the Glenelg Report, the Commercial fishing industry injected about $40 million annually into the local economy, making it an important contributor, and Recreational fishing will have greatly increased this value to the community in the last few years.

The Port of Portland

One large employer of people directly affected by the success or otherwise of some of the above industries, is the Port of Portland and the service industries allied with it, such as transport and storage. The deep water Port in Portland enables bulk handling of grain, woodchips, timber & related products, livestock and silica sands. Plantation pine woodchips and logs are one of the main products exported through the Port.
A major import through the Port of Portland are fertiliser products. Incitec Pivot, an agricultural fertiliser factory based in Portland, uses the imported materials in its products. If agriculture was heavily reduced by the contamination of ground, surface and bore water, and the general reduction of water available as it is diverted into fracking, then the need for both these important industries in Portland – fertiliser and Port – would be reduced, with the resultant reduction in local employment.

All these industries that directly employ thousands of people, indirectly employ many more through service industries that grow up around them – from schools and health providers to retail outlets and supply and maintenance businesses.

In our opinion it is folly to even consider this destructive industry in Victoria, let alone in the Glenelg area. The Glenelg area is significantly dependant on Agriculture, Forestry and Fishing for the employment of its citizens.

A further implication for local and regional development, investment and Jobs

Tourism and Lifestyle

"Baby boomers" are retiring in huge numbers and many are seeking a lifestyle change away from the overcrowded City and Metropolitan areas of Melbourne to the coast or country where living is cheaper and less stressful. Given the heavy burden of a huge and fast growing population on existing city infrastructure, such as roads, and essential services such as public transport and the provision of power and water, the Victorian government must encourage the exodus of people from the city to rural and coastal areas, and not entertain any thought that could result in the destruction of some of the most liveable areas in Victoria. Likewise Tourism is a growing industry in Victoria and many of the growing number of retirees are chosing to spend their retirement years touring around and visiting places in Australia rather than going overseas with its attendant problems such as jet-lag, and being out of their "comfort zone", not to forget the expense on a retired income. The value of the Australian dollar has been dropping against most other currencies over the last couple of years and this will encourage more people to holiday in Australia rather than overseas. The Tourism industry is an important one and destroying peaceful country areas by turning them into wastelands, not to mention poisoning the ground and surface waters that serve local Australian wildlife such as kangaroos, emus, wallabies that graze on the land and drink from streams or wherever groundwater is available, will do nothing to encourage Tourism.

(4) the ability of potential onshore unconventional gas resources contributing to the State's overall energy sources …..

For the reasons stated previously we do not believe onshore unconventional gas mining should be considered at all at the moment.

(5) the resource knowledge requirements and policy and regulatory safeguards that would be necessary to enable exploration and development of onshore unconventional gas resources, including -

(a further scientific work to inform the effective regulation of an onshore unconventional gas industry, including the role of industry and government, particularly in relation to rigorous monitoring and enforcement, and the effectiveness of impact mitigation responses.

Unconventional mining of Shale and Tight gas requires very deep drilling which goes through many strata including aquifers.
It is not possible to monitor the durability and intactness of the outside sheathing of the bore casing, which the Society of Petroleum Engineers' Report "Why Oil Wells Leak; Cement Behaviour and Long Term Consequences"cites as a serious weakness in the whole operation of unconventional gas mining. The Report also states that:
This weakness eventually causes all bores to fail.
The weakness can allow unnoticed the spread of contamination through successive strata including aquifers.

If water aquifers become contaminated there will not able to be an *impact mitigation response.* No amount of knowledge, policy and regulatory safeguards, monitoring or quick action will be able to stop the spread of the contamination deep underground.

There should be no unconventional gas mining, either on-shore or off-shore, until the technology used can absolutely guarantee the safety of the environment. At present *further scientific work* ***cannot do anything*** *to inform the effective regulation of an unconventional gas industry* ***other than to ban it.***

(b)performance standards for managing environmental and health risks, including water quality, air quality, chemical use, waste disposal, land contamination and geotechnical stablility;

The only way to ensure environment and health risks are minimised is for the government to demand the Mining Company takes out an Insurance Policy to cover the above listed items, and all the short and long term flow-on effects caused by contaminations, to bring them back to the exactly the same state they were in before the Mining Company did the Fracking. No reputable insurance company would make insurance available for something which potentially could cause devasting and far-reaching effects on the environment and the health of a country; nobody, not even the Federal Government, could underwrite it, and this should say it all.

(*6) relevant domestic and international reviews and inquiries covering the management of risks…..*The risks, only some of which we have identified here in our Submission, are too great to allow for a *Management* approach to them. We have not elaborated on health issues to humans and animals, for example.