

SUBMISSION TO THE PARLIAMENTARY INQUIRY  
INTO UNCONVENTIONAL GAS MINING IN VICTORIA

My name is David Arnault and I am a resident of Mirboo North, having lived in this region for 27 years. I am a writer and have been for 40 years, including 15 years working with generation industry in the Latrobe Valley, first as the Internal Communication Manager within the Production Group of the SECV, and then as a freelance writer producing among other things the annual environmental reports for one of the private companies.

Most of my education took place in Canada. I have a bachelor's degree from the University of Waterloo. It is a non-major degree, a well rounded education with equal emphasis on biological sciences and the humanities. In addition, I was granted a post-graduate diploma of Education from Monash University, and studied Economics while working with the Yukon Government.

Although I was once vice-president of the Yukon Conservation Society, I am not now a member of any group associated with industry, the environment or a political party.

I will address the terms of reference of this inquiry although I believe the committee is being ushered in a predetermined direction, that of permitting onshore gas: in some respects this is to be expected as the governing classes consider development as progress, even when it is destructive. More discernment is required.

I will try to convince the committee that Victoria, as a state, should replace the current moratorium with a complete ban of onshore gas extraction.

I know the committee is looking for facts: it has made that clear. But let me remind the members of the committee that we are dealing with human beings, not rational beings. To exclude the fears, the emotions, the anxieties, the passion and the love of land that exists within humans is to deny them their humanity. This you cannot do. This you do not do in your own election campaigns and in your own speeches to the legislature.

Even the ABC's Alan Kohler claims the market is irrational. It's part of life.

Now, before I turn to the terms of reference, I would like to preface my arguments by addressing three issues that have been not included in the terms of reference and which the committee ought to examine: culture, sustainable development and climate change.

### CULTURE AND HUMAN RIGHTS

The Diamantina River flows through the Channel Country of remote Queensland. Winding rivers and large waterholes characterise the landscape as multiple channels braid across wide floodplains in what is a remarkable and arid landscape, and one that is subject to huge floods which can cause the rivers to overflow and often transforms the landscape into vast wetlands that provide vital habitat for waterbirds, fish, reptiles and mammals. The Channel Country is the traditional territory of the Mithaka people, who have lived there time out of mind and their connection to this land remains strong: indeed, the Mithaka's culture is inseparable from their special relationship with their rivers and waterholes.

But the culture of this people is threatened today as gas companies are proposing hundreds of wells to extract shale oil and gas that lies under the rivers and floodplains. The process of fracking will harm the Channel Country's lands, waters and the health of all humans who live there or near. "If our rivers and waterholes are polluted by petroleum exploitation and fracking, we will lose our stories. If we lose our stories, we lose who we are, and we lose our will to go on." explained a spokesperson for the Mithaka.

However, the Queensland government is pushing ahead despite the opposition of the traditional owners. Under international law, the Mithaka have a right to enjoy and maintain their culture. Fracking poses a serious pollution threat to Channel Country's waters, flora and fauna and, consequently, to the Mithaka's culture and identity. The Mithaka also have a right under international law to be meaningfully consulted and involved in decisions about the exploitation of resources on their traditional lands, especially when that exploitation threatens their culture. That consultation has not happened and the Mithaka have been forced to take the issue to the international level, alerting the UN Special Rapporteur on the Rights of Indigenous Peoples to the violation of their human rights. The Mithaka have asked this body to investigate and call on Australia to protect their rights.

The people of South Gippsland have also voiced their objection to fracking and coal mines. While lacking some of the avenues of appeal open to indigenous people, those in South Gippsland ought still to be able to rely on our own human rights. Australia was a signatory to The Universal Declaration of Human Rights in 1948.

Article 3 of that declaration states that "everyone has the right to life, liberty and security of person". If you were to ask South Gippslanders, most would tell you that this is exactly what is under threat, their lives, their futures, their freedom to choose, their investments in land and their connection to land which often stretches back for generations.

If you were to ask the people of Seaspray (and I have talked to them on many occasions) they would talk about what it is like to be under threat for years. And they would tell you about the arrogance and the bullying that goes on by the gas companies specifically in an attempt to weaken their resolve. You would see people who have often been reduced to tears by the stress and their anxiety.

You would get the same response from most people in Mirboo North. Our life, our liberty, our security of person, our property values, the amenities of our town, the landscape we love, the access to clean air and water, the promise of a future for our children and grandchildren are all under threat.

Article 7 of the Universal Declaration of Human Rights states, "All are equal before the law and are entitled without any discrimination to equal protection of the law. All are entitled to equal protection against any discrimination in violation of this Declaration and against any incitement to such discrimination."

This is far from the case in Victoria. All are not equal before the law. Mining companies, even those from overseas, are awarded the rights to all minerals below the ground by governments who are putting the rights of miners before the human rights of their own people. This is just as true in Victoria as it is in WA or Queensland and it is a violation of Article 17, part 2 which states that "No one shall be arbitrarily deprived of his property".

At issue is not just the rights of human beings, but like the Mithaka, it is about culture and it is about community. The people of South Gippsland should have the right to protect their culture, their heritage, the quality of their lives. The people in the communities across the state should have a loud and powerful voice in the determination of their future. When a woman says no and the man forces himself upon her, it is rape. What do we have when a community says no and a corporation or a government forces itself upon the people? Is it not some variation of rape sanctioned by government and upheld by the police?

## SUSTAINABLE DEVELOPMENT

The Mineral Resources (Sustainable Development) Act 1990, Section 2A states that the Act must have regard for the Principles of Sustainable Development.

Sustainable Development, as defined by the World Bank, is “Development that meets the needs of the present without compromising the ability of future generations to meet their own needs.”

Because of the parlous state of the biosphere we call Planet Earth, the United Nations is developing a rights based definition of sustainable development. This approach refers to the diverse range of all social, political, and economic processes that effectively serve to preserve, restore, or create the environmental, social, and economic conditions necessary for all persons, including future generations, to fully enjoy their civil, political, economic, social and cultural rights.

Under neither of these definitions can unconventional gas extraction be seen as sustainable. Even allowing for the flexibility that industry and government build into the phrase ‘sustainable development’ no one can seriously argue that mining is sustainable development.

Onshore gas is particularly egregious because of the damage that is done to the land, the water resources and the economy. The gas companies argue that farming and fracking can coexist. Really? The one example given in the hearings in Sale was nonsense, since the gas drilling is exploratory; it is not a production gas field with concrete pads sometimes more than a hectare in size, crisscrossing all weather roads, pipelines, compressors and flaring. Nor do we know what kind of incentives have been offered to the landowner.

Imagine a gas field in South Gippsland, on the small strip of land between the Strzelecki Ranges and the coast, where much of the arable land is found on the floodplain of creeks. Lakes Oil and Ignite are proposing to drill more than 100 wells on the floodplain of Merriman’s Creek, a fertile ribbon of land which floods regularly. What will happen to the toxic chemicals they use and store in inadequate holding ponds?

Unconventional gas is a game changer. If allowed into Victoria, it will destroy our culture in South Gippsland and elsewhere; it will industrialise the landscape and destroy the economic base of the region.

I am not opposed to mining. But I do ask that we be intelligent and discerning in our decisions as to which proposals we permit and which we reject. At present, there are very few mining proposals which are rejected, which says to me, and to many others, we have an open slather.

There may come a time in the future when we will develop methods to access the gases locked safely in the seams of coal beneath the ground, but that time is not now. Fracking is a blunt instrument akin to using a bulldozer to crack an egg. It is time to leave fossil fuels in the ground, where they can do little harm.

## CLIMATE CHANGE

One fifth of the carbon dioxide we put into the atmosphere today will still be there in 33,000 years.

Planet Earth is on a path of destruction, as has been pointed out by Pope Francis, the University of Melbourne's Sustainable Society, The Lancet and many, many other organisations. Some people have criticised the Pontiff for his language and others for entering the political sphere. However, I suspect most people recognise that he has done what he must do: he has spoken up for mankind and for the earth. And he has identified the culprits in the spiralling decline of the biosphere: greed and thoughtlessness.

Recently, a Dutch court ordered the government of the Netherlands to act in such a way as to reduce the nation's greenhouse gas emissions by at least 25 per cent by 2020. The ruling came after almost 900 Dutch citizens took their government to court in April, 2015 in a bid to force a reduction of greenhouse gas emissions by 40 per cent by 2020, compared to 1990 levels. The court ruling wrote: "The state must do more to reverse the imminent danger caused by climate change, given also its duty to protect and improve the environment." It also said effective control of a nation's emissions is "one of the state's tasks".

The Lancet in its recently launched report identified four direct effects from climate change: increased frequency and severity of storms, prolonged periods of drought, increased incidents of widespread flooding, and more severe heatwaves. The report also identified four indirect effects: decline in water quality, deterioration of air quality, forced changes in land use and ecological change. The Lancet used this information to underscore the potential health impact on human beings and claimed climate change has the potential to wipe out the last 50 years of health advances.

In 2010, a July-August heatwave resulted in 11,000 deaths in Moscow, according to The Lancet's report. That was just one example of many heatwaves that have killed. The report explains that in Australia, the intensity of drought will increase by 40 percent, summertime temperatures by four degrees, and two and a half times more heatwaves will be our lot.

The Lancet has also pointed out that "climate risks might be both amplified and modified by social factors. The links between food production and food security in any country, for instance are strongly determined by policies, regulations and subsidies to ensure adequate food availability and affordable prices."

Some have tried to argue that fracking and gas do not contribute to climate change. This argument is nonsense. Peer reviewed data is now pouring in and it is unequivocally dismantling the myth of gas as a clean energy source. One of the most convincing and frightening studies has come from the United States. Using satellite-based imagery over a five year period, scientists have discovered the largest single hotspot in the United States, an area covering 6,500 square kilometres. This hotspot is directly over the most active coalbed methane production area in the country.

A ground station in the Total Carbon Column Observing Network, operated by the Department of Energy's Los Alamos National Laboratory, provided independent validation of the measurement.

Although the area under study is currently employing fracking, the seven year study period predates the introduction of fracking. The study's lead author, Dr Eric Kort of the University of Michigan, Ann Arbor, concluded the results of study indicate the methane emissions are attributed to leaks in natural gas production and processing equipment. "The results are indicative that emissions from established fossil fuel harvesting techniques are greater than inventoried," Kort said. "There's been so much attention on high-volume hydraulic fracturing, but we need to consider the industry as a whole."

He also pointed out that natural gas is 95-98 percent methane and the gas is colorless and odorless, making leaks hard to detect without scientific instruments.

The report issued by NASA pointed out that, “Coalbed methane is gas that lines pores and cracks within coal. In underground coal mines, it is a deadly hazard that causes fatal explosions almost every year as it seeps out of the rock.”

Research scientist Christian Frankenberg of NASA’s Jet Propulsion Laboratory (JPL) in Pasadena, California, first noticed the Four Corners signal years ago in SCIAMACHY data. Dr Frankenberg noted that the study demonstrates the unique role space-based measurements can play in monitoring greenhouse gases. (It also underlines how difficult it is to disprove the spin of the gas industry, flimsy though it is.)

The link for this study is [http://science.nasa.gov/science-news/science-at-nasa/2014/09oct\\_methanehotspot/](http://science.nasa.gov/science-news/science-at-nasa/2014/09oct_methanehotspot/)

The evidence is coming in now but it raises the question of why the industry has tried so hard to hide the truth. Industry must have known the true situation; after all, their own people (many of them scientists) are there on site. The time has come to disregard what industry has to say. Industry is motivated by profit and there is no reason to think that they are behaving any more ethically than the tobacco or asbestos industries. We should expect the same sort of accountability to result when the health impacts begin to be felt: the gas companies will be gone by then, and they will be protected by their clever tactics and loopholes designed to liberate them from accountability. There is only one way to deal with unconventional gas: ban it.

While the Victorian government seems intent on cosying up to the gas industry (see the speech from Treasurer Pallas to the APPEA) and preparing to allow four or five new coal mines, a powerful alliance of business, welfare, environmental groups and trade unions is demanding an end to Australia’s decade of political paralysis and division on climate policy. And this group is insisting on emission reductions and cross party cooperation.

Meanwhile, the Upper House committee’s does not include climate change in its considerations, perhaps pretending onshore gas has nothing to do with climate change. Nor is climate change part of the considerations when approving coal licences. It is madness.

## THE COMMITTEE’S TERMS OF REFERENCE

1. the prospectivity of Victoria’s geology for commercial sources of onshore unconventional gas

There is no secret as to what is below the ground in South Gippsland. There have been small black coal mines from Phillip Island to Yarram in the past. I myself live in a coal miner’s house built 120 years ago; it was moved from the South Gippsland hamlet of Buffalo to Mirboo North.

The Victorian government has been kind enough to tell the mining companies where to find the resources; this has been going on for years. Lately, the government has been especially generous to fund a geoscience survey which will provide for the industry what amounts to an MRI scan of the earth down to a depth of 40 kilometres. All of this is tantamount to a subsidy of the mining industry.

Of course there’s coal beneath the fertile land of South Gippsland. So what? There may be coal seam gas: I consider it irrelevant. Unconventional gas is a disaster waiting to happen. To impose it upon South Gippsland (or Victoria) I consider an egregious act of irresponsibility. The consequences will not be felt by the members sitting on your committee: you will no longer be in office. All of our children and grandchildren will be the ones harmed.

On page 15, I talk about the local geology in some detail and argue that it is not conducive to gas extraction.

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

In 1961, Rachel Carson's ground breaking book 'Silent Spring' was published and it changed the way the world viewed the introduction of chemicals into the biosphere. The book spawned volumes of progressive legislation and was the midwife for the US EPA. However, we seem to have forgotten the lesson she taught. In the midst of the largest gas rush in history, when industry and government were hailing the advent of shale gas, the US House of Representatives Committee in 2012 took a very conservative viewpoint. Acknowledging the political advances of lessening dependence on Middle East fossil fuel, it also issued a caution, and we must remember that at that time there was very little monitoring of onshore gas emissions. This in itself troubled the committee. It wrote,

*'Questions about the safety of hydraulic fracturing persist, questions which are compounded by the secrecy surrounding the chemicals used in hydraulic fracturing fluids.'*

It is ironic that one of the centres of fracking in the US is the state of Pennsylvania, Rachel Carson's home state. Over and over, Rachel Carson reminded us of the consequences of acting without caution, of trying to shape the world to our desires with industrial muscle. After all, that's why the spring became silent.

But all too often, industrial muscle is supplemented with political muscle. In Pennsylvania, the state government passed a bill referred to as Act 13. Hidden away in the bill was a small section which made it illegal for GPs to inform their patients when the symptoms that were afflicting them were consistent with those associated with breathing, drinking, eating or coming into contact the carcinogens, mutagens and allergens associated with the shale gas industry. The act also took away the right of local communities to prevent fracking operations within the boundaries of their county, in effect clearing the way for fracking across the entire state. In 2013, the Pennsylvania Supreme Court struck down that second 'carte blanche' thereby protecting the rights of counties to control land use planning.

But the gas companies are still whispering in the ear of the legislators in Pennsylvania. For example, consider this: there are 7,788 active wells in Pennsylvania and 4,006 recorded violations, although total fines amount to only \$6.1 million, an average of \$1,500 per violation. How much is a human life worth? How much a river that kills the animals that drink from it, or burns the flesh of the children who swim in it? How much a compromised aquifer? Fifteen hundred dollars?

Across the state line from the centre of activity of the onshore gas industry in Pennsylvania is the western part of New York State which shares the same Marcellus Shale formation. There, after years of deliberation, New York State officials placed a ban on unconventional gas citing the impact of water resources, the introduction of dangerous chemicals into the environment, the problems of waste disposal and the impact of vast increases in truck traffic. The New York State officials also were concerned about air quality, noise, damage to habitat, cultural, historic and natural resources, agriculture, community character and socioeconomics.

(source: [http://www.dec.ny.gov/docs/materials\\_minerals\\_pdf/findingstatevhf62015.pdf](http://www.dec.ny.gov/docs/materials_minerals_pdf/findingstatevhf62015.pdf))

One final note about Pennsylvania: the Supreme Court refused to deal with the gag rule on GPs; this issue is ongoing.

This gagging of doctors is consistent with trends around the world, including Australia, governments preferring to silence the critics instead of giving them a fair hearing. Is the state of Victoria, any different? Ask any former employee of the EPA and find out the truth.

Energy companies all over Australia use their political muscle whenever they need to, and they arm themselves with former cabinet ministers, well connected men and women who can whisper in the ears of decision makers in quiet corridors and clubs. Peter Reith and Alexander Downer have been associated with Lakes Oil and provide that energy company with an audience unavailable to those who oppose gas development.

In New South Wales, the executive officers of coal and gas associations contain former advisors to Liberal and Labor government or bureaucrats from the environment department. Actually, the reverse is true as well. This is well documented.

A recent report from Fairfax has exposed what, disturbingly, is all too common in the hydrocarbon industry. Fairfax has demonstrated how far the Indian mining giant, Adani, has penetrated both the Labor and Liberal parties. A litany of ex-staffers and lobbyists from both major parties are now working for Adani as it seeks federal government approval for its Carmichael coal mine, Abbot Point coal port and dredging in Great Barrier Reef. The government's own treasury advisors are saying the Adani project is "unbankable" and yet the project has legs and this is because of political influence, not common sense, because of greed, not economics, because of corruption, corruption of basic democratic principles.

In the Canadian Province of British Columbia, despite opposition from the vast majority of residents, industry and government are trying to take advantage of a potential boom in shale gas and plan to pipe the gas across three geologically active and glaciated mountain ranges to the coast where five gas terminals will be constructed. At least one of these terminals is at the head of a 50 kilometre long glaciated fjord; at the mouth of the fjord is a small archipelago of islands that must be negotiated before ships carrying the gas can enter the straits which are known for their dangerous tidal surges. I have been to this location; I have see the tides and I know that ships are careful in the extreme. The government and industry are assuring the public that nothing can go wrong.

The government's published information talks of the benefits but not the risks neither to the environment nor the climate. Not everyone is so constrained.

*Proposed plans to expand the unconventional gas industry in BC will dramatically increase greenhouse gas (GHG) emissions, making the province's climate action goals impossible to meet. Even though unconventional natural gas is the cleanest burning fossil fuel, the process of extraction (fracking) and exporting (including: liquefaction, shipping, re-gasifying, and piping the gas to its final destination) needs to be factored in.*

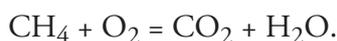
*Considering these 'full life-cycle' emissions, some critics have argued unconventional natural gas extraction could lead to higher pollution rates than other fossil fuels. A study by the Pembina Institute found that if five LNG proposals become operational, it could result in almost as much carbon emissions than what the Alberta oil sands currently produce (click on image to see the Pembina Institute's full infographic).*

*Despite the Province's claims that LNG will reduce emissions, developing the LNG*

*industry in BC will contribute to global climate change and continue the world's reliance on fossil fuels.*

(source: <http://bcInginfo.com/learn-more/environment/climate-change/>)

Personally and chemically, I take issue with one phrase used in the above quotation: 'cleanest burning fossil fuel'. This phrase implies that burning methane is clean. Chemically methane is CH<sub>4</sub>, one atom of carbon and four of hydrogen. The burning introduces oxygen to the methane molecule.



More correctly, one molecule of methane is burned with two of oxygen to produce one molecule of carbon dioxide and two of water. Certainly, what is clear is that when you burn methane you introduce carbon dioxide into the atmosphere.

However, methane is the bigger issue of the two. "Atmospheric methane concentrations are of interest due to methane's impact on climate change, as it is one of the most potent greenhouse gases in Earth's atmosphere. Over a 100-year period, it traps 29 times more heat per mass unit than carbon dioxide. (Wikipedia, Atmospheric Methane)

South Gippsland is a region with "pronounced year-to-year variability of rainfall ranging from droughts to very wet years. Temperatures have increased significantly since 1950, by about one degree celsius," according to 'Appetite for Change: global warming impacts on food and farming in Australia' published by the University of Melbourne Sustainability Institute. The report goes on to say that continued warming is expected by as much as four degrees by 2070 (compared to the 1980-90 average). More hot days and nights can be expected with summer heatwaves; rainfall is expected to decline in the cool season and, "the reduced rainfall and higher temperatures are expected to lead to more frequent and intense droughts and bush fires, and greater stress on water resources."

The above mentioned report predicts heatwaves will drive down milk production by 40 percent and have a deleterious effect on orchards and crops. Increased demand on the aquifer will lead to further subsidence and increased incursion by salt water.

If nothing else, the increased risk of bushfire ought to be a warning siren. Gas wells and bushfire is a troubling combination and there is no mitigation measures that can be taken to prevent disaster.

Climate change will have a deleterious effect on agricultural production and we are not making plans to prepare for that. We are in fact proposing to fuel carbon change and transform some of our best farmland into wastelands, South Gippsland included. Who is leading this country? At the same time, The Lancet nominates global food scarcity at the single biggest health problem the planet will face.

Already the people of South Gippsland have been presenting opposition to fracking for two years (the people of Seaspray much longer than that). Given that we have had a major coal fire in the Latrobe Valley (my house, 35 kilometres away from the fire, was covered in soot) and we have felt under assault from coal mining companies, fracking companies, former cabinet ministers in the employ of gas companies, insincere politicians, consultants with hidden agendas, and now this committee which seems to be covering the same ground, there is no wonder that people are beginning to feel stressed.

Ironically, this is one of the health effects talked about in the Lancet's report, the point where the direct effects

of global warming combine with the indirect and manifest with social dynamics. Mental illness, allergies and cardiovascular diseases are just three of the health impacts mentioned in The Lancet's report, in this case exacerbated by this political melodrama.

For the direct impact of fracking chemicals and risks for the health of children I refer the committee back to the testimony of Doctor Jo McCubbin presented at the hearings in Sale. Among Doctor McCubbin's arguments was the concern over air pollution, that our lungs offer a direct pathway for dangerous chemicals to enter our bloodstreams, and that endocrine disruptors and carcinogens were a huge concern especially for those most vulnerable such as children.

### 3. the coexistence of onshore unconventional gas activities with existing land and water uses

The assertion was made by Claire Miller at the Sale hearings that AGL was operating a gas well in coexistence with a dairy farm. AGL's own web site says only that it has a pilot well, possibly two, and a compliant landowner in Gloucester, New South Wales. However, what we never have had in Gloucester is an operational gas field in coexistence with a competently run dairy operation.

In fact, according to the NSW EPA, AGL operations at Gloucester have been suspended after two incidents which indicated leaks of radioactive materials into the groundwater and the presence of BTEX chemicals at its Gloucester coal seam gas project. These findings came about months ago, but AGL's website still claims that "The produced water is thousands of years old and brackish (more saline than fresh water but not as much as seawater). One of the ways that produced water is managed once the project goes into production is for the produced water to be desalinated so that its salt content is reduced. The resultant water can then be used to irrigate suitable agricultural lands and crops."

The Sydney Morning Herald (April 9, 2015) reported that "AGL has ended its trial of using coal seam gas waste water for irrigation in northern New South Wales after regulators found it left behind unacceptably high levels of salt and heavy metals". Heavy metals entering the food chain pose a risk to human and animal health and increased salinity reduces sustainable agriculture. In all my reading over the past five years, this is about par for the course with onshore gas companies and indicates a general disregard for honesty.

I have spent a lot of time in southeastern Victoria (from Port Fairy to Nelson) and in East Gippsland. My confidence about the unsuitability of unconventional gas comes from studying the history of onshore gas extraction in parts of the United States (particularly Pennsylvania) and in Canada (in the Yukon and Alberta).

I have spent a good bit of time in Seaspray and have been given tours of the gas well-heads scattered around the area. I know of the ambitious plans to have over a hundred wells on the flood plain of Merriman's Creek. Some of the well-heads are visible from the primary school. The flood plain of this creek is dairying heaven. If it became a gas field it would be impossible to farm it. Farming will never be compatible with the gas industry, not when you take into account the all-weather access roads, well pads (some up to a hectare in size), compression stations, evaporation dams and pipes crisscrossing the landscape.

There are approximately 7,000 bores used for domestic and stock purposes across South Gippsland using an average of 1.3 ML per year. This water is taken from the upper aquifer. In addition, there are approximately equal entitlements from each of the three aquifers – roughly 60,000 ML; these three entitlements are granted to Melbourne, the coal fired power industry in the Latrobe Valley, and for dewatering of off-shore gas wells. We have to

remember that all the aquifers are linked and the resource is limited. (I refer to the aquitard in page 15)

An industry like coal seam gas uses considerable quantities of water. I would suggest that the water-use figures presented by Lakes Oil at the Sale hearings are a product of a fevered imagination. A 2011 US EPA report estimated that 70 to 140 billion gallons of water are used to fracture 35,000 wells in the United States each year - approximately the annual water consumption of 40 to 80 cities each with a population of 50,000. These figures come from Sourcewatch and the numbers translate to approximately 4 ML per well per year. Ignite and Lakes are proposing to place more than 100 wells on the floodplains of Merriman's Creek. This works out to at least 400 ML per year. These figures depend upon the depth of the frack. Deeper horizontal fracks can use up to 30 times this amount.

In the case of Gippsland, this water would have to come from an aquifer that is already over-allocated. The aquifer levels in Seaspray and Yarram for example are dropping 30 cm a year. (From personal interviews with local farmers.)

It is nonsense to suggest that fracking and agriculture can coexist since they are competing for the same resources: land and water.

And this does not take into account the waste produced by onshore gas wells. Produced water contains an alarming amount of toxic, sometimes carcinogenic waste that the industry cannot and will not deal with adequately. In the Chinchilla region the toxic wastewater, with heavy metals, is being used on the roads to suppress dust and, more alarmingly, on crops. The same is happening in Pennsylvania. No doubt it is happening all over the world. Why don't we know more? The short answer is that the industry isn't monitoring and most environmental protection agencies are overworked, under-resourced and/or muzzled – and one doesn't have to look further than Victoria's EPA.

However as an example, let's look at the US. There the EPA set out in 2010 to find out if fracking is polluting drinking water. The answer was critical to future US regulation of the multibillion-dollar fossil fuel sector and to ensuring water safety for millions of Americans. But after five years of fighting with the oil and gas industry, the agency is still unable to provide a clear answer.

"We won't know anything more in terms of real data than we did five years ago," said Geoffrey Thyne, a geochemist and a member of the EPA's 2011 Science Advisory Board, a group of independent scientists who reviewed the draft plan of the study. "This was supposed to be the gold standard. But they went through a long bureaucratic process of trying to develop a study that is not going to produce a meaningful result."

This is what is meant when the industry says there is no proven link between fracking and human health. The truth is buried, the terms of reference are compromised politically or the research is hamstrung.

In the event of the inevitable combination of a leaking well and a flood that carries the toxic waste onto a flood plain, it is not even clear who would be responsible for contaminated beef or milk. The Australian Feed Lot association has been trying to clarify liability and even hired a consultant to investigate, but in a bizarre indication of how much secrecy surrounds fracking, the consultant was told it could not release its report. Douglas Gordon, the association's Chief Executive stated in a communiqué that while the landowner may have some recourse against the gas company, it appears that he or she will have "primary liability".

In Australia, the laws about accountability and liability are muddy and worrying.

Clearly, this is a situation that could ruin not just a single farm but an entire community and might additionally destroy the reputation of the entire Gippsland dairying industry. And I might point out that this is exactly what

the community of Seaspray had been saying for years, only to be disabused by the gas industry and patronised by politicians.

Leaks and spills of drilling fluids, whether of chemicals used in fracking, wastewater or other substances, provide a route for contamination. In 2012, the Denver Post reported that, according to state data, there were more than 2,000 spills at oil and gas operations in Colorado since 2008 resulting in more than 350 cases of groundwater contamination.

Migration of fracking chemicals through the porous or cracked seams into aquifers are common, according the United Nations report released this year (*A guide to rights-based advocacy: International Human Rights Law and Fracking*). The report detailed numerous instances of abuses by companies. At the heart of the concerns was the dilemma of what to do with the produced water. Even if the fracking companies were angels, there is no safe way to store it or dispose of this waste material: it is akin to nuclear waste in that it is dangerous and life threatening.

The report mentioned above focuses on how the existing international human rights framework can be applied to the issue of hydraulic fracturing with a view to understanding the impact of fracking on human rights and how action can prevent human rights violations. It should be required reading for members of the committee.

### 3b the legal rights of property owners and the impact on property values

Property owners have very few rights when it comes to mining. The National Party has come out in support of a farmer's right to veto mining or gas extraction on his or her property, but a mine or a gas field impacts not just on the farmer who makes an arrangement with a gas company to use the property or sell it: it impacts on his or her neighbours. There are people in every community who want to move on and will take any opportunity to sell up for as much as possible. That is their right, but when the consequences of such a decision drive the price of their neighbour's land down, or deny him or her their living, then the original decision is unethical and the policy shortsighted.

The basis of mining law in Victoria was established in the 19th century when the colonial government felt mining was a viable means to advance economic growth. The 1958 Mining Act codified the rights of miners and the responsibilities of the government: however, it had a long list of exemptions including lands with bona fide agricultural and residential purposes. Most of these exemptions were removed in subsequent legislation.

We are no longer in the colonial era of early Victoria. We now are aware of the larger issues facing Australia and the planet. We are now dealing with multinational corporations with untold wealth and power. In the glare of what is happening to the natural world upon which we depend for our survival, the rights of miners appear lurid, and the miners themselves like the Marvel villains they often are, running roughshod over the earth and leaving a trail of destruction in their wake. It begs the question as to why politicians continue to genuflect to them. Is it the cash? Is it as simple as that? There are other paths to follow.

I have tried to find some evidence of land price declines but it is all anecdotal. The local real estate agents I spoke with did not want to get involved with political issues.

## 3c implications for local and regional development, investment and jobs

Lakes Oil pulled a rabbit out of the hat at the hearings in Sale: a rumoured \$50 million investment by a Chinese group to use Lakes Oil gas in a project that would generate 1,000 jobs. The project was a petrochemical refinery. It is unlikely there was even a grain of truth in this assertion. However, let's examine the claim. If there is Chinese interest, it is likely that, following the free trade agreement, the plant would be staffed by Chinese nationals (apart from the public affairs unit). There is no shortage of petrochemical plants in the world, so no doubt the proponent feels he can compete on the basis of price which means a petrochemical plant somewhere in the world will be mothballed and leave a legacy of toxic waste for generations to come. And this is what will happen to this imaginary refinery using gas supplied by Lakes Oil. Refineries of this sort have a cancer trail associated with them, a red line on government maps that carries the cancer on the prevailing wind. The cancer can be counted on, the benefits cannot be relied upon.

Why would China get involved? Fifty million dollars doesn't build a refinery, it should be noted. But if they were fishing for interest, the Chinese might be concerned about the dangerously polluted environment in China and outsourcing the pollution would have benefits. Let's be clear, this cannot be viewed as an investment: it is destruction. Either that or it is a fiction.

Even if it were true, who the hell wants a petrochemical refinery in rural Victoria? This would exacerbate the environmental and health consequences by an order of magnitude from the extraction of the gas.

Everything has to be big for the hydrocarbon people. But South Gippsland is small. Portland is small. They both have small but viable fisheries, small but growing tourism industries, small populations with modest needs. People want to live their lives and raise their children, enjoy the summer and rug up in the winter. And they've made it clear that they don't see gas companies as anything but a threat to their lives, to the commercial fishery and sport fishing, to the tourism industry and to the health of themselves and their neighbours.

There is no social licence for gas extraction (or coal mines), but there is a quiet determination to protect the land they live in from these continual assaults from people who are more interested in personal wealth than personal accountability.

## 4a ability to provide a competitive source of energy and non-energy inputs for Victorian industries

The myth of gas shortages has been well-documented: it has been promulgated by the gas industry and its acolytes. Peter Reith came to Mirboo North and spread it around like fertiliser. But the truth came out shortly afterwards when Credit Suisse let it be known publicly that Santos (and possibly other gas companies) were ramping up production for export in order to take advantage of world prices. In so doing, the gas companies were about to expose the entire country to world prices. Yes, there is a danger of gas demand outstripping gas supply but that's only because too much of Australia's gas is being exported. The gas companies have never been more profitable and yet they still want more. Australia is the only gas producing nation in the world which doesn't reserve enough gas for domestic needs in order to keep the price down and the economy healthy.

Mr Reith was subsequently employed to design the public consultation process that produced the report held up by Mr Arbuthnot at the Sale hearing; this was a report that exhaustively canvassed regional areas for the views of the public and then, upon finding no social licence for unconventional gas, based its report on a last minute phone

survey of less than a thousand people. It was a flawed process from the beginning; in fact, it was cleverly designed by Mr Reith to extract the answers he and the gas industry wanted.

(Note: According to the Herald Sun, November 8, 2013, Mr Reith then became a lobbyist for a company which provides its services to at least two groups with strong interests in coal seam gas (CSG). One of those clients had just won a \$1.8 billion contract from a CSG producer for the construction of gas compression facilities in Queensland.)

The state of Victoria could address that by lobbying the federal government to ensure that the state had sufficient quantities of Bass Strait gas for our domestic market.

#### 4b an affordable energy source for domestic consumers

To be blunt, domestic and industrial consumers across Australia are going to be hit with huge increases in gas prices. This is already having an effect with a few industries re-locating in the United States where gas prices are low. The federal government has chosen not to protect the domestic market? Why? No one has the courage to say. They say free market, but how 'free' can the market be when Australia is the only gas producing nation which doesn't protect its domestic markets. If I were less a less diplomatic person I might accuse the federal government of being disloyal to its own people and the Australian business community. In any event, onshore gas excitement exists to take advantage of the global market. Does anyone really think Lakes Oil's ambitions include benefitting Victorians? The only option that presents itself for Victoria, is renewable and this is where the state has to go. It is not a future option: the technology is available now.

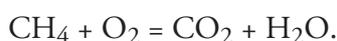
#### 4c. carbon dioxide emissions from these sources;

On pages 4 and 5, I talked about the NASA survey of methane hotspots. I spent time talking about the largest of these hotspots. To reiterate, the report stated, "In each of the seven years studied from 2003-2009, the area released about 0.59 million metric tons of methane into the atmosphere. This is almost 3.5 times the estimate for the same area in the European Union's widely used Emissions Database for Global Atmospheric Research." It's worth mentioning that on the website's map there were what appeared to be thousands of other hotspots across the United States.

I also remind the members of the committee about the authors conclusions that methane emissions are attributed to leaks in natural gas production and processing equipment. "The results are indicative that emissions from established fossil fuel harvesting techniques are greater than inventoried."

Here's the link, once again: [http://science.nasa.gov/science-news/science-at-nasa/2014/09oct\\_methanehotspot/](http://science.nasa.gov/science-news/science-at-nasa/2014/09oct_methanehotspot/)

I also re-draw the commission's attention to the basic chemistry of methane on page 8.



As I said earlier, methane is the bigger issue of the two. Over a 100-year period, methane traps 29 times more heat per mass unit than carbon dioxide.

5a 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

By all means, continue the scientific research, but right now it is clear that there can be no effective regulation of an onshore unconventional gas industry, because the industry poses risks that are unacceptable. And there are no mitigation responses to risks that are unacceptable apart from a complete ban.

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

Managing environmental and health risks? It's quite simple: prevent the onshore gas industry from getting off the ground. And help the other Australian states to come to their senses. I know some committee members will scoff at this and say I'm just a nay-sayer. That's not what I am. I am convinced by the work I have done in the past five years that the extraction of methane is a breathtakingly irresponsible thing to do. There is no safe way to do it. And I would challenge the industry to show me evidence – conclusive evidence from around the world where a well has not leaked – one example from around the world where ground water or subsurface water has not been compromised.

#### 6. relevant domestic and international reviews and inquiries

I have included several links already and, in addition, I refer the members of the committee to two lists of peer-reviewed research which have come to my attention in the past few days. I have looked at quite a few of the abstracts but I have not been able to go through all this material in time for this submission. But I'm sure some of the committee members will be able to before your report is released. What I have seen in these lists confirms what my research over the past half-decade has led me to believe. Here are the links.

[http://www.psehealthyenergy.org/site/show\\_list/id/13](http://www.psehealthyenergy.org/site/show_list/id/13)

<http://www.psehealthyenergy.org/site/view/1180>.

#### LAKES OIL

The 1958 Mining Act of Victoria required proponents of mining licences to be 'fit and proper' persons. The ASX also makes this requirement of those who wish to be listed. Judging by what I witnessed at the hearing in Sale and what I have learned from my time in Seaspray, I question whether the Lakes Oil spokespeople indeed meet the ASX requirements, one of which is that he or she must be of good character, diligent, honest, and possess integrity and judgement. I will address this issue with respect of three issues that the Lakes Oil spokesmen included in their testimony, fire, drilling and consultation.

## Lakes Oil – fire

Onshore gas is the most profitable sector of the fossil fuel industry and has attracted a lot of cowboys. There are volumes of anecdotal evidence to support this claim, but of course no peer-reviewed research. But the history tells tales reminiscent of the wild-cat days of petroleum exploration and drilling, men prepared to risk it all for wealth. In fact the risks are to landholders, farmers, homeowners, children, future generations, and not to the miners. Nowhere is this more applicable to Lakes Oil than the fire that was referred to on several occasions in the Sale hearings. On that day, Lakes was entertaining a potential investor and sought to impress him by flaring off some gas. I visited the site some time afterward but I have talked to one local resident whose home was threatened by the subsequent fire; and I have talked to other residents who were close to the action and who talked to CFA firefighters who were called to the scene. In addition, one of the CFA volunteers gave evidence at Sale. The flaring was the action of cowboys, immature boys posing as responsible men.

Fire in general is a grave risk when it comes to fracking. Even on Total Fire Ban days, these companies are allowed to flare, indeed they have to in order to maintain their production which goes on 24 hours a day and 365 days a year. Local residents in Seaspray have been told by their own CFA station that in the event of a fire, the CFA's first job will be to protect the gas plant. One can understand why this is so, given the serious danger involved, but it leaves the residents without protection and possibly without insurance. You would need to talk to them to discover this.

## Lakes Oil – drilling

If you examine a map of the geology of South Gippsland, including the area around Seaspray, you'll see that the land has been formed in a variety of geological eras and is remarkably discontinuous, having been visited by volcanic disturbance often as well as seismic shifts and rising and falling sea levels. In their presentation in Sale, Lakes Oil talked about the aquitard as if it were a plastic sheet which had been laid down by an engineering deity. An aquitard is, by definition, an impermeable layer between the aquifers, but it is not continuous. It becomes breached over time and we must remember that water never stops flowing. Generally the aquitard is reasonably effective in minimising the flow between layers but it's not a perfect seal by any stretch of the imagination. This weakens Lakes Oil's arguments substantially.

At the hearing in Sale, Lakes Oil went into a detailed technical explanation of their drilling technique, as if to say that it is foolproof. Let us examine this claim. Their drilling technique is not unique. Gas companies the world over use it the same technique or something similar. The initial drilling does not create a frictionless surface at the edge of the hole. This is important to understand because when the concrete is forced from the bottom of the pipe up into the space between the steel pipe and the side of the drill hole, it naturally takes with it dirt, rocks, organic material, partly decomposed bodies of possums or wombats, in short anything along the side of the drill hole. These particles cause weaknesses in the concrete and sometimes voids. This is one reason why the failure rate in gas wells is so high (five percent in the beginning rising to 40 or 50 percent after a number of years.) I would challenge Lakes Oil to provide evidence of one well anywhere in the world that hasn't leaked. I suspect they would not be able to.

However, Lakes Oil would have us believe their operation is surgical in nature and free of risk. In fact, the drilling and the rest of the process is more like a jackhammer than a scalpel. the following is from Lakes Oil's own submission to the ASX:

*Operating Risk: Industry operating risks include the risk of fire, explosions, blow-outs, pipe failure, abnormally pressured formations and environmental*

*hazards such as accidental spills or leakage of petroleum liquids, gas leaks, ruptures or discharges of toxic gasses, the occurrence of any of which could result in substantial losses to Lakes Oil due to injury or loss of life, severe damage to, or destruction of property, natural resources and equipment, pollution or other environmental damage, cleanup responsibilities, regulatory investigation and penalties and suspension of operations, the occurrence of any of which could result in substantial losses to Lakes Oil. Damages occurring as a result of such risks may give rise to claims against Lakes Oil. The occurrence of an event that is not covered, or fully covered, by insurance could have a material adverse effect on the business, financial condition and results of operations of Lakes Oil.*

It is interesting that the company warns the shareholders but not the landowners (or the committee, it seems). At the Sale hearing, Lakes Oil talked about its drilling plan, but it didn't mention the more than 100 wells planned for the floodplain of Merriman's creek. Perhaps they ran out of time to address both of these issues, the risks the shareholders were warned about and the other drilling in Seaspray, on a flood plain.

#### Lakes Oil – consultation

Lakes contradicted the testimony given by residents and shires so there is little more to be said about this. Except, Lakes did communicate with the community: it did this through the media, with bizarre press releases, one of which said the company was going to abandon its Seaspray holding and move to Western Victoria and then, the next day, reversing that, giving the residents just enough time to breathe a sigh of relief and then, as it were, sticking the knife in again. After the moratorium, the company issued a press release saying they were going to drill onshore but drill horizontally out under the ocean to exploit gas offshore. Again, it appeared to be an attempt to confuse, intimidate, and weaken the resolve of residents. The company used the media to raise the profile of the company prior to share releases but it also used the media to harass the community of Seaspray: this is a view many residents of Seaspray have expressed to me.

#### Power of mining corporations

There are probably 10-20 core people in every community in South Gippsland, people who give of their time freely to oppose unconventional gas; they dig into their own pockets to pay for posters and other expenses, people who give up their weekends and evenings to study and research the issues. And there are many, many others in the communities who support them in other ways; even if most of the people in the communities don't understand the details of the threat as clearly, their anxiety is real. These core volunteers feel they are under assault from highly paid mining executives, bureaucrats, miners with government grants and investors and lawyers. In many ways it is an unequal contest but the civilians of South Gippsland and elsewhere in Victoria accept it: it is unequal because we are fighting for our communities while the miners are after a paycheck.

Although it has nothing to do with mining, the recent legislation, part of the newly formed Australian Border Force, which threatens staff at refugee detention centres with two years in jail if they make public disclosures or blow the whistle about the goings on in the centres, even if the goings on are illegal or violate human rights, is reminiscent of the law passed in the American state of Pennsylvania. The notorious Act 13, mentioned on page 6, which gags general practitioners is symptomatic of the 21st century.

I mention this as an indication of the power that mining companies have and the apparent sway that they have on political decisions. The power they possess allows them to swagger, confident of their rights supersede those of mere mortals. Most recently, we have the absurd information that the forthcoming meeting of environment ministers in Australia will witness a troubling development.

The following is from the organisation known as Environment Justice:

*Australia's environment ministers will meet on Wednesday 15 July to decide on new national air pollution standards. These new standards will set the benchmark for assessing and licensing new coal mines (Australia's biggest source of particle pollution), coal-fired power stations, export terminals and many other polluting sources. Stricter standards will mean tougher licence conditions and greater prospects of proposals being knocked back. But we have heard that environment ministers are considering caving to industry pressure to change the standards so that they no longer apply to small communities or 'hot spot' communities close to pollution sources. This would mean that any regional community near a pollution source could lose the protection of the national pollution standards.*

## SUMMARY

We work with what we know, what we have learned and what we trust. We know that life grows out of the energy provided by water and light. We have learned that living is based on love and fear. We trust in our inability to discern the truth, even though it is not always easy to do so.

Sun and light. These have been provided for us by interstellar forces – however unimaginable the scale of these forces, the principles are simple and elegant. The sun's energy is provided to the planet without cost and without obligation, almost as if a divine being were safeguarding our existence.

Water. Two molecules of hydrogen, the most common element in the universe, and one molecule of oxygen. Water. We are beings made up of water. We survive on plants and animals made up of water. We swim in it, wash in it, drink it, glory in it on a hot day and grieve when it washes away the flimsy structures we manufacture to enhance our lives.

Fundamental principles. We have abused the atmosphere. So far, we have punched a hole in the ozone layer turning the sun into something life threatening. We are systematically degrading the quality of the earth's water resources. Poisoning the rivers, lakes and seas with allergens, toxins, mutagens and plastic – and we have no idea what that will mean in the decades to come.

How much of this tainted water will be introduced into our tissues and into the flesh and the fibre of the food we eat? How much of it will become resident therein? We now know that toxic chemicals (eg DDT) banned generations ago are still being passed to our children through the breast milk.

Will we ever embrace the fundamental principles? We don't answer these questions and we proceed arrogantly, throwing a few scraps to research institutions while instructing them to monitor the air, the water, the life span of our poor, the health of our children.

Monitor: a euphemism for recording the history of our folly.

Pope Francis recently called for changes in lifestyles and energy consumption to avert the "unprecedented destruction of the ecosystem" before the end of this century. The pontiff warned that failure to act would have "grave consequences for all of us".

We must remember that it is rare for a Pontiff to speak out about a political danger facing the Earth. The last time it happened was in 1931 when Pope Pius XI decried the growth of a three-pronged danger of extremism. The three prongs of his warning were Fascism, Communism and unrestrained Capitalism, pressures that resulted only eight years later in the beginning of World War II.

Already there is anger at the encyclical by Pope Francis with Republican senators telling the Pontiff to do his job and they'll do theirs. They were elected to represent the people of Iowa or Delaware not the poor of Bangladesh or Pacific Islanders, or the oppressed in the Congo. The Pontiff is doing his job, he's speaking for the planet and for its inhabitants. Our local politicians, like those in the US think too much about their local concerns and their petty economies without giving a thought to the planet and the relationship our lifestyle has to the misery and suffering in other parts of the world.

Let us remember, the warnings of Pius XI were ignored by the political leaders of the time and the cost was tens of millions of lives; perhaps the warnings of Francis will suffer the same fate.

Climate change is not just about politics: it is about health, the viability of our species, social justice, the environment, wisdom, grandchildren, the poor, the disadvantaged, the freedom to rise to our potential and the creatures that live on land and those in the precious seas.

The Earth is a closed system. It is rich in resources but if the exploitation of those resources causes more harm than good, they must be left in the ground. We learned this with asbestos. With hindsight, we know it should have been left in the ground where it was sequestered, where it could do no harm. The lesson of asbestos influenced our views on uranium mining. Even though mining went ahead, it did so with pressure from industry but without public support. That support is still absent for the public knows that nuclear energy is leaving a legacy that may well poison the generations that will follow us, if we haven't found a satisfactory way to deal with the waste or if there is not some other way to undermine human existence before then.

What you create, you must live with. If what you create is inimical to life, then it should not be manufactured. What you mine may create useful products but it will also produce unintended consequences. Two years ago, Mount Morgan in Queensland was struck by torrential rainfall which caused the long forgotten tailings pond to overflow into the Dee River, a major tributary of the Fitzroy. For nearly 100 kilometres, the river became toxic, but what was most disturbing to some was the knowledge that there were hundreds of old workings like Mount Morgan scattered over Queensland, thousands across Australia: these old mines are time bombs waiting for the fuse to be lit.

The people who operated and mined Mount Morgan are dead and those as yet unborn when the mine was closed are suffering the consequences.

Another example is right here in Gippsland: after all these years, the old workings in Walhalla are still leaking toxic materials, heavy metals including mercury, into the groundwater up in the mountains: silent and slowly moving, the toxins have been moving to the Latrobe River system and are now causing disruption to the fisheries in the Gippsland Lakes: arsenic and heavy metals threatening a permanent end to the commercial fishery.

Coal was once plant life, but over millions of years it has been transformed by heat and pressure into a volatile substance. It has partnered human innovation in driving the industrial revolution. The cost has been high; the cost continues to be high.

According to the report Health and Climate Change, everything we need to make the transition to renewable energy is in place now. Let us begin. Let us leave behind fossil fuels. Let Victoria lead the way for Australia. Let us end the corporate donations that leave political parties beholden to corporate ambition, and let us build a more robust democracy.

It is often said that democracy is a flawed institution, but infinitely better than the alternative. Yes, it's true, indeed a truism, but the statement reflects a complacency. What is better than democracy is a less flawed version of it, one that is respectful of human rights, the environment and universal justice.

David Keith Arnault

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