

# **The Australian gas fields; personal insights into the health impacts and limitations of regulation**

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**January 26<sup>th</sup> 2013**

I am a GP who lives and works in suburban Brisbane. I come from Tempo in County Fermanagh. When, at the end of 2011, my family back in Ireland, drew my attention to the prospect of fracking in County Leitrim (Republic of Ireland) and County Fermanagh (Northern Ireland), I gleaned most of my information from the shale gas industry in the USA and Canada. What I learned from the North American experience really worried me. However, a few months later I realised there was just as big a problem in Australia. Through a community initiative called “Bridging the Divide”, I took a bus trip out to a rural residential community five hours drive from Brisbane. What I found shocked me and I have returned several times to try to help them. The place, the Wieambilla Estate, is usually referred to as “Tara” but it is in fact situated thirty five kilometres away from Tara, which is the nearest small town.

Wieambilla consists of blocks of land, between twenty to eighty acres in size, in the remote Australian bush. There are very few services and the roads are dirt roads. Many families moved there from the cities to find a safe and idyllic spot to raise their children and to them Wieambilla seemed like Utopia. These families, who built their homes in clearings, are now completely surrounded by gas fields. The children are sick. The parents are sick. There is a recurring narrative of constant headaches, nose bleeds, sore red eyes, nausea, fatigue, chest pains, cough, sinus problems, rashes, tingling and numbness of limbs, collapse, fits, twitchy babies, children becoming clumsy and unsteady on their feet....

There is a back ground level of illness which is way above anything you would expect. In addition, there are severe exacerbations where many people are very ill at the same time. These are usually associated with odour events, changes in wind direction and temperature inversions.

Gas fields surround them. Gas fields hem them in. There are gas wells (at a guess six hundred), gathering lines, high point valves, low point valves, compressor stations, and dehydration plants. There are huge evaporation ponds, about a mile long by a half mile wide, from which the volatile organic compounds evaporate and blow in the wind. There is deliberate venting and flaring of gas and there are fugitive gases coming directly out of the ground.

Last weekend it rained and gas bubbled up through the puddles. Some of the children collected the bubble water in a jar and were able to light it at the first attempt.

Scientists from Southern Cross University visited the estate a couple of months ago and found the level of methane in the air at 6.89 ppm was higher than that reported anywhere in the world including the gas fields of Siberia. The National Oceanic and Atmospheric Administration (NOAA) has since estimated fugitive emission from shale gas in the USA at 9% of production.

The Wieambilla estate is not the only place in Queensland where gas is bubbling. For a 5km stretch along the nearby Chinchilla River the water is literally bubbling like a sauna, and at the end of last year near Dalby there was a bushfire they couldn't put out for many days. A blue flame was burning straight out of the ground.

The people in Wieambilla have been trying to get help from the Queensland government for at least 3 years. They have repeatedly told them they are sick but the government has done nothing to help them. It seems that some people are just walking away, desperately cutting their losses. Many though are trapped because there is nowhere for them to go and they have large families. They have mortgages but their homes are now worthless. Nobody wants to live there anymore. I got a copy of the Chinchilla News a week or so ago. In it there was a notice of an Auction for non-payment of rates. Incredibly there were 19 properties up for auction - 11 were from the Wieambilla/Tara area.

In July last year, Queensland Health announced that they were investigating the reports of ill health. Since then, spokespeople for the Queensland government and the gas industry have implied that Queensland Health have found no health problems. The implication or innuendo is that the issues are either commonplace in any community (normal childhood illnesses, flu) or specific to that particular community; maybe an issue with hygiene etc, etc. All symptoms are dismissed as anecdotal.

No report has been published but I have spoken with the Queensland Health doctor organising the investigation. She is doing it in addition to her normal workload in public health. Not one of the Queensland Health doctors has been to the estate. I suggested she carry out a house to house health survey. She told me she didn't have the resources. In the meantime the children are still sleeping with the fugitive emissions. Seven months have elapsed and there is still no report.

No independent testing has been done. Chronic exposure levels have never been determined. There is no systematic testing in place and baseline testing was never done. Baseline health studies were never undertaken. The government and the gas company have recently taken a few sporadic tests of air and water. Although they haven't released any official reports, the test results have been given to the residents and they have been told by the gas company that there is no problem. That spin has been reported in the papers.

But if you look more closely at these government and company test results you will find barium, boron and strontium were found in the rainwater collected from the roofs. Toluene, acetone, chloromethane, dichlorodifluoromethane, hexane, phenol, propene, acrolein, vinyl acetate, methylene chloride, 1,2,4 trimethylbenzene and methylethylketone have been found in the air.

I tried to organise some biological testing but there are very severe limitations. One is the limited availability of tests of any sort. There is an infinite range of chemicals which could be implicated but tests available for very few. The ones for which tests are available may not be the ones causing the problems on the day. There is also the problem of the half-life of the chemicals in the body, which is sometimes a matter of 1-3 hours. This is important because the nearest laboratory to take the samples is an hour's drive away.

Then there is the cost. Testing is very expensive. Most frustrating of all is the problem of finding a lab which can test but which is not bought and paid for by the industry.

I tested three people and got positive urine results in two. A farmer from Kogan, a few kilometres from the estate, had both hippuric acid as well as methylethylketone in his urine. Hippuric acid is the main metabolite of toluene. A little girl who lives at one end of the Wieambilla estate returned a negative result but a three year old boy from the other side of the estate had the metabolites of toluene in his urine at a level so high it approached hazard level for occupational exposure. The levels for non-occupational exposure particularly in a child should be minimal. Low levels of hippuric acid may be detected if a person has a very high dietary intake of healthy coloured fruit and vegetables but this sick three year old certainly wasn't in that category.

Toluene is a well-known neurotoxin. It is a skin irritant and suspected reproductive toxin.

Despite very limited environmental testing or biological testing having been done a very disturbing pattern has emerged of toluene in the air and water, metabolites of toluene in the urine, methylethylketone in the air, and methylethylketone in the urine. The resident's symptoms seem somewhat less anecdotal.

Wieambilla is not the only place impacted by health impacts but it is the one where the most people are living both relatively closely together and close to the gas infrastructure. I am hearing of more remote areas further west where there are also problems; there are also accounts coming

out of New South Wales. A friend was talking to a social worker out of Roma. She said that 80% of her workload in mental health is related to impacts from the gas industry.

The farmer whose urine tests came up positive owns (with his son) a 5,000 acre property at Kogan. His grandchildren have been so ill that his son and daughter in law have abandoned their home and taken the children to a rented property in New South Wales.

In Queensland currently, it is believed that the number of gas wells is of the order of 3,000. They are looking at a peak of 40,000 wells and at present are building the infrastructure to ship the gas to China. (The gas has been presold, but none has been ring-fenced for the local Queensland market. Believe it or not, they are expecting gas shortages and the prices to rise locally.)

Three immense pipelines are being laid all the way from central Queensland to the LNG plant being built of coast near Gladstone on the Great Barrier Reef. This distance is of the order of 500 kilometres. The destruction of the Great Barrier Reef is merely collateral damage. Each of these three pipes is 1.4 metres in diameter and each pipeline corridor has a 20 metre clearance of resumed land on both sides. The three companies involved do not share corridors - they just take more land.

Most of the farmers in the area do not yet have gas wells on their properties but they have had no end of problems with the pipeline. The companies takes down fences at will; the dingos follow the pipeline corridor and one farmer had more than 160 sheep killed as a result. The companies take off the top soil causing erosion; they spread weeds; they mix the topsoil and subsoil; they trench creeks and change the flow of the water; they cause spills; they interfere with the normal functioning of the farms; they prevent access to people's own property; one farmer has so far lost four season's crops and the pipeline isn't even in place yet. The companies show complete disdain and disrespect for the farmers.

So what about the legislation? You might assume that it would protect the people. In Queensland, we are reassured that we have best practice and we certainly seem to have endless legislation. However, the problem is that the legislation is designed to ensure that the gas developments go ahead at all cost. The gas projects are declared to be of state importance. Simply by declaring Significant Public Status, the Coordinator General can guarantee that the project is approved and can proceed without the recommended restrictions. The companies work on a policy of "adaptive management" while the Queensland government continues to amend the environmental laws across the state to suit them. As a result, responsibilities for damage caused to the environment and to public health by companies is minimised.

For example, in their environmental impact statements, Santos, Tamboran's new joint venture partner, say they will treat the produced water (i.e. the contaminated waste water) by reverse osmosis to Australian standards before disposing of it in Dawson Creek. Although the regulators know that it is impossible to reach this standard the project gets the go ahead. Then, when the gas company have all the waste water sitting there, they say 'Oops, we can't treat it to Australian standards but we want permission to dump it anyway'. It is not even near standard; ammonia is 45 times guidelines, sulphate 80 times guidelines, boron 8 times guidelines and total suspended solids twice guidelines. Neither would this be a one off small volume exception; they would be pumping 12-18ML per day. The law is currently in the process of change to accommodate them and the toxic waste will go in the creek.

Incidentally, Tamboran's associate Santos is one of the companies responsible for the disastrous Sidoarjo mud flow in Indonesia which started in 2006 and is still flowing. It is the biggest mud volcano in the world and was created by a blowout during drilling of a natural gas well in which Santos had an 18% share.

There was a public outcry about evaporation ponds, so the legislation was changed to outlaw evaporation ponds; the industry just renamed them 'holding ponds'. The government also changed the legislation so that instead of requiring the companies to promptly treat the immense volumes of toxic waste water, they were allowed to just leave it sitting (evaporating) in the holding ponds. So what typically happens? The waste sits in the holding ponds until the next rainy season and is allowed to reach the point of overflow. Then with just a phone call (since it is an emergency), the company is given permission to pump it out into the rivers before it actually overflows.

What makes this so incredible is that the regulations controlling the behaviour of farmers have been stringent. The farmers could not even cut down a tree without permission. It is illegal for them to damage an aboriginal heritage site. Now all the miners need do is inform the relevant government department that they are going to clear the land; no questions asked and no investigation necessary.

The amount of water farmers are allowed to use is tightly controlled. They have a defined water allowance and every drop of water from their bores is metered and paid for. On the other hand miners can extract unlimited water from the Great Artesian Basin without paying a single penny.

All moderating forces appear to have been decimated. The Environmental Defenders office, a state funded legal team, a type of legal aid for environmental issues, has been stripped of its funding.

The State Compliance Enforcement Team has been cut. The reduction is from something like sixty down to four.

The state commitment to compliance monitoring in 2013 is:

- For fracking chemicals; one desk study per year and a field trip if necessary.
- For damage to the aquifers; one desk study per year and a field trip if necessary.

Meanwhile in New South Wales, AGL are planning to frack under the suburb of Cambelltown in Sydney's water catchment. The Sydney Catchment Authority (the body which was set up in response to the city's worst drinking water crisis) has been reconfigured to omit a public health expert on its board. This is despite the legislation that governs the authority stating that board members must individually or collectively have "qualifications and experience relevant to water quality and public health." The public health expert has been replaced with a mining executive.

Knowing all this, what sensible person would allow the gas company on to their land?

In Australia, the landowner owns the land and no one can trespass. However, the crown owns the mineral rights. Whoever wants to access the subsurface has to get the agreement of the landowner. Paradoxically, it is also the law that the landowner agrees. No one has the right to say no. The only question is of compensation. For gas wells, the gas company is not prepared to buy the land outright; they just pay for access which is a pittance. It is only for major infrastructure like holding ponds or compressor stations that they purchase the land. The farmer has twenty days to come to an agreement; then it goes to mediation for a further twenty days and if agreement has still not been reached, the company can take the landholder to the land court. As soon as the company submits the application to the land court the company can go onto the land - the case doesn't even have to have been heard.

By whatever means the gas company gets agreement, once they are on the property they do what they like. And importantly, the authority for the gas company to access the land stays with the

property even if the owner sells. The next owner may not even know. There is no central database.

If the company wrecks the owner's property they have to come to a "make good" agreement with the owner - but only if the owner can prove it was the company that did the damage. So for example, if they wreck the owners bore (perhaps the only source of water for his family or his stock) they have various choices. They can try sinking a deeper bore (which might work for a while), they can nominate a sum to compensate him or they can truck in water. And of course, all agreements are confidential. Modelling of the damage to the Great Artesian Basin indicates it will take 150 to 200 years to recover. The gas industry may last 30 years. Who will be trucking water to the farmers for the 100 years after the gas company has gone out of business?

So the people have no rights in the law even though there is an immense amount of legislation. Any legislation that puts an obstacle in the way of the gas/mining companies is changed, if not literally overnight then close to it.

The only strategy that has had any impact so far in Australia has been community organisation and civil disobedience. The strategy of "Lock the Gate" was initiated by the farmers. The principle is to deny the gas companies permission to come on the property, to not give them access to the surface, to not negotiate, to not come to any agreement.

Individual landowners lock the gate, but more importantly whole communities do. In Australia where ever a landowner has locked the gate, the gas company has not once called their bluff and brought them to the land court. They have left them alone and targeted someone else; they have even bent the pipeline to go around their property. The reason is that most people in Australia don't know what is happening and the companies fear the unpalatable truth will come out in the land court.

Unfortunately, the company can get a foot in the door if the community is not strong and united. It only takes a few weak links. The gas companies are really good at picking off their targets to get a foothold; the trusting and uninformed, the crusty old guy who doesn't get on with his relatives, someone ill who can't carry on, the family with financial problems so bad they would be made up with a few bucks, the greedy one who doesn't care and who is given a sweetener to be the local poster boy for the gas company...

They will also sniff around pretending to be the good guys, throwing a trivial amount of money at the local football team or sponsoring a major sporting or cultural event. They positively try to split communities.

Community strength is the only protection. People must be proactive in engaging with their friends, with their neighbours, with everyone. People need particularly to engage those who would be vulnerable to exploitation and ensure that there is no social licence. People need to be vigilant and ensure that the gas company or their representative do not get access to the land for any reason - not for seismic testing, not for exploration bores, not for access roads, not for pipelines. Not for anything.

It is vitally important that medical professionals educate themselves on the emerging science and also be proactive in protecting the health of the people of Ireland. If you feel you don't know enough to take a position or voice an opinion then you really need to make the effort to find out. This is not someone else's responsibility. Believe it or not there is no one better qualified than you.

Worldwide, the reason the unconventional gas industry has been able to deny causation for so long is that independent health professionals and scientists were not involved. Baseline environmental testing is routinely omitted; health impact assessments have not been required; there has been no compulsory register of health impacts and properly planned and funded long term epidemiological studies have never been devised or implemented. The long awaited American EPA investigation will cover neither health impacts nor air emissions. No studies have been undertaken into the safety of food sourced from exposed livestock or fish from impacted surface waters despite the US Centers for Disease Control calling for a study over a year ago.

The unconventional gas industry is one which is intrinsically unsafe and should not be permitted in Ireland. If we want our children, our grandchildren and generations to come to be healthy and well, to have safe air to breathe, safe water to drink and fertile land in perpetuity then we must employ the precautionary principle now.

In this high risk industry legislation won't prevent human error. In the unseen depths hundreds of metres below the surface legislation won't stop salt and acid corroding steel and cement.

Bernard M Goldstein in an article titled 'The Precautionary Principle Also Applies to Public Health Actions' says:

*"The precautionary principle asserts that the burden of proof for potentially harmful actions by industry or government rests on the assurance of safety and that when there are threats of serious damage, scientific uncertainty must be resolved in favor of prevention. "*

There is no debate really - it is prevention not precautionary measures we must insist on.

The legislation we should be engaged in creating must enforce a total ban.

Geralyn McCarron.