

Submission
No 257

INQUIRY INTO COAL SEAM GAS

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Submission Regarding Coal Seam Gas Mining submitted by Joanne Murray,

I am absolutely appalled and dismayed by the recent rapid expansion of large-scale mining, in particular coal and coal seam gas mining. Approximately 25% of NSW is currently covered by coal seam gas exploration licences. The coal seam gas is a large scale industry. In Qld today there are approximately 4000 wells already in production with 40,000 planned over the next two decades. 'The rush to CSG is based on the economic needs of government and the demands of industry rather than upon due scientific and economic diligence'. (<http://www.jeremybuckingham.org.au/>). The government might make a quick buck from mining royalties, but the long-term costs of CSG will outweigh these by several orders of magnitude. These costs will include health effects such as greatly increased rates of cancer, ill-health, depression and suicide, as well as permanent, devastating environmental effects. None of these ubiquitous effects of CSG mining are good for productivity, the economy or the overall state of the nation. CSG mining may be good for the GDP, but it is very bad for all the things that really matter: health, community, air quality, water quality and general quality of life for all but mining executives and shareholders.

Throughout NSW and Queensland there are many tales of how mining companies bully their way in with money and lawyers, divide communities, pick off farmers one-by-one, until towns are destroyed or become nothing more than service centres for the mines. "It is certainly not a community unifier. This is actually destroying these communities and, in fact, the only thing that is keeping them unified is their opposition to coal seam gas on their land. It is laughable to suggest that this is a renewal of our rural communities. This is the death of our rural communities at the altar of short-term profit."
(<http://www.jeremybuckingham.org.au/>)

What has been happening to rural communities under coal seam gas and coal exploration has been outrageous; the custodians of land and food resources are being treated with pure contempt. They have had insecurity imposed upon them and all the health impacts that accompany possible displacement. Barnaby Joyce, the Nationals' Senate Leader, described the appalling situation succinctly: "What is the point of generations going through the privations of going without, to pay off and improve a block of land, if at some arbitrary point in time, a person you have never met, from a transaction you were never part of, can show a superior ownership right to the one your family worked generations for?"

Research has found some towns across QLD and NSW where coal seam gas drilling has started is causing adverse health symptoms among residents. Residents of Tara, near Dalby, have released graphic images and accounts of rashes, illnesses and infections they claim occurred last year when coal seam gas project teams operating in the area used water from their extraction process to suppress dust. Tara residents began complaining in 2008 about leaking gas wells and the dumping of CSG water on roads, as well as a brown, oily substance in a creek. One resident said people had been forced to leave their properties because of stress and related illnesses, including nose bleeds, nausea and vomiting. The findings, by lobby group Get Up into the effects of coal seam gas have prompted the organisation to present a petition of over 45000 signatures to the Federal Government. The organisation wants an independent investigation into the whole coal seam gas industry after their research found many families living in towns where drilling had commenced were suffering from health problems like passing out, headaches, skin rashes and bleeding from the nose and ears.

The second issue is the potential health impacts on those living in coal seam gas mining areas via water pollution. There are serious concerns not only with the hazards of the chemicals which may be used in fracking but also with those arising in coal seams themselves which may be brought to the surface, "This

flow-back water can contain volatile organic compounds, high concentrations of ions such as calcium, iron, magnesium, sodium, strontium, and also radioactive substances. "Potential long-term hazards are cancer and deformities" (National Toxics Network (NTN)).

Hydraulic fracturing or 'fracking' forces a mix of water, sand and chemical into the CSG well at high pressure to fracture the surrounding coal in order to improve gas flow rates. It also has the potential to create fractures outside of the seam and can link the well with fresh water aquifers. This potentially exposes fresh water aquifers to fracking chemicals and other contamination existing within the coal seam.

Not only will the land underneath our feet be fractured and poisoned forever, the surface of the land will become an ugly, polluted industrial nightmare. The surface impacts from CSG relate primarily to the quantity of infrastructure required to connect wells with pipelines and roads, water management facilities, processing facilities, compressor stations, and transmission pipelines to power stations and export terminals. Depending on the environment, the impact on the surface can undermine the agricultural potential of an area or significantly disrupt the environmental values of bushland. Establishment of CSG mining infrastructure involves clearing of large swathes of native vegetation. In June 2011, Eastern Star Gas was investigated by the Federal Environment Minister for potential breaches of Federal Environment laws due to the extent of clearing within the Pilliga Forest during their exploration activities.

The thought of the beautiful, unique, world heritage scenic beauty of the Northern Rivers along with the rest of NSW and indeed, Australia, desecrated by ugly mining infrastructure, is enough to throw me into a state of deep depression. The future suddenly looks so bleak that I feel I would not be willing or able to carry on living in a 'fracked up' country. The crumbling of western economies and societies induced by the blatant control of governments by corporations, made especially evident by the global mining frenzy, has induced deep feelings of despair and despondency. The whole horrific situation feels apocalyptic.

The short-sighted, greedy people in positions of power who allow this desecration to take place will go down in history as those who destroyed Australia, having sold our country- our future- to multinational corporations in return for a quick buck. Or in return for nothing- except pain and suffering- as is the case with NSW. The royalty arrangements in NSW are 0% for the first five years, 6% in year 6, 7% in year 7, 8% in year 8, 9% in year 9 and 10% in year 10 and for remaining years. In 2010 royalties from coal seam gas were only \$462,000. Industry experience in NSW has shown that peak production of wells often occurs in the first few years of the life of a well with production dropping off significantly after that. This means that NSW under the current arrangements will miss out on most of the royalties. It's as though because we owe China so much money, they own us and have complete power over us. It's truly a terrifying, demoralising prospect. The Federal and NSW State Governments appear to only represent the agendas of foreign-owned multinational mining corporations. They are failing miserably in their job to protect the people and represent their interests.

The bulk of projects currently being developed in Australia and NSW are targeted to the export market. Metgasco in Queensland are proposing an offshore processing and export facility off the coast of Ballina. A pipeline to Queensland through the world heritage Border Ranges National Park would see the major deposits currently under exploration in the Gunnedah Basin and north to the Queensland border transported to Gladstone in Queensland where four major export terminals are planned.

The mining industry in Australia is 83% foreign owned. The Edwards Report says \$50 billion in mining profits will be sent out of Australia in dividends over the next five years. Meanwhile many people in mining communities must deal with higher prices in their local community, an influx in transient workers and environmental and health effects. The mining boom is bringing prosperity to some, but coming at the expense of many in regional and rural NSW and is squeezing out other, more sustainable industries. 'Revelations that the Chinese Government owned Shenhua Coal is buying out productive farms in the Liverpool Plains has highlighted the need for government action to bring the mining industry under control.' We should not sacrifice our agricultural productivity, manufacturing, and service industries such as tourism, in order to dig out more coal and exploit coal seam gas. The CSG industry should be banned until it is known to be completely safe, which means banned indefinitely, because some of the effects will not become apparent for years, and by then it will be too late, permanent damage will have been done.

There is absolutely no need for a 'transition fuel' to fill any gap in energy demands as Australia moves towards renewable energy, especially as the claim of CSG being 'clean' is dubious at best since the greenhouse gas emissions profile for CSG is subject to significant uncertainty. According to a senate submission from groups opposed to coal seam gas, the footprint from coal seam gas is heavier than coal. That's because the emissions involved in producing the gas – drilling, fracking, compressing, pumping, liquefying and transporting the gas, together with the loss of carbon-storing forests and woodlands cleared to make way for wells and pipes, as well as direct CO₂ and fugitive methane emissions – makes its carbon footprint much bigger than gas companies and governments claim.

Some Problems with Coal Seam Gas Extraction

Water extraction:

"Current projections indicate the Australian CSG industry could extract in the order of 7,500 gigalitres of co-produced water from groundwater systems over the next 25 years, equivalent to ~300 gigalitres per year." This volume is more than half of existing total extraction from the Great Artesian Basin. The CSG industry presents a "significant potential risks to water and our water management as a result of the scale of the development of the sector." (National Water Commissioner, July 2011). We don't have the scientific capacity to know for sure ... that this is not going to have a long-term impact on the Great Artesian Basin, either through the dropping of the water table, or through cross-contamination. Some of that water is two million years old and it is the crucial water source for our rural communities." (Queensland's new greens senator, Larissa Waters).

Waste Water:

In Gloucester where AGL are approved to drill 110 gas wells, the company expects the equivalent of one Olympic swimming pool per day of this wastewater to be extracted across the field (i ref.) The water that comes up from the coal seam is often saline and contains naturally occurring chemicals from within the coal seam. The National Toxics Network released a report in June 2011 indicating that the BTEX chemicals (Benzene, benzene, Toluene, Ethylbenzene and Xylene) are found naturally in the coal gas seams and that the fracking process can release BTEX from the natural-gas reservoirs, which may allow them to disperse into the groundwater aquifers or to volatilise into air. "The production of large volumes of treated waste water, if released to surface water systems, could alter natural flow patterns and have significant impacts on water quality, and river and wetland health." (National Water Commissioner, December 2010).

There have already been several cases of pollution associated with CSG in Australia and their number grows every day. These include: an uncontrolled gas and water release at a CSG well near Campbelltown operated by AGL, carcinogenic toxins found in several drilling sites in central Queensland, and multiple explosions and leaks at gas wells around Tara. With all the earthworks going on, tributaries turn murky and there's a large risk of contaminated waste water collected from the extraction process overflowing from ponds during flooding, or being re-injected into aquifers. There are coal seam gas wells around Casino with large volumes of produced [= contaminated waste] water potentially moving into the floodplains. 'These are coal seam gas wells on a floodplain! We've got gas wells in Camden, 100 metres from schools and horse-riding camps and 50 metres from homes.' (Jeremy Buckingham, NSW Greens MP).

A report by the country's peak non-government toxic and chemicals body, the National Toxics Network, revealed in June that Australia Pacific LNG Pty Ltd had been given permission by the Queensland government last year to dump treated water containing 80 different chemicals and radio nuclides – at a maximum volume of 20 mega litres a day – into the Condamine River for an 18-month period. The Condamine River flows into the Condamine Catchment, then links up with the headwaters of the Murray-Darling river system. The chemicals included a range of toxic substances like lead, cadmium, chromium, mercury and BTEX – a combination of benzene, toluene, ethylbenzene and xylene that has since been banned in Queensland, although, at the time of writing, this ban had yet to come into effect.

NTN reviewed a number of industry environmental authorisations to look at their risk-assessment documents, as well as the list of chemicals the industry had provided. Of the 23 chemicals identified, only two had been assessed by the national chemical regulator. Those two had not been assessed for their use in fracking. The 23 chemicals included some that damaged the lungs and, in the case of ethylene glycol, were associated with spontaneous abortions among factory women. Others were endocrine disruptors, affecting hormones and the way the body functions. Still others were capable of producing degenerative changes in rat brains.

A recent report showed fracking near water bores increased methane levels in those bores to potentially explosive levels.

Natural Gas Pollution:

In July 2011, the community-based organisation, the Global Community Monitor, released the report, *Citizen Investigation of Toxic Air Pollution from Natural Gas Development*. Air samples were collected from neighbours of natural gas operations as well as targeted sampling sites including the well pad, compressor station, gas separation plant, dehydrator and waste disposal site. Analysis detected 22 toxic air contaminants associated with natural gas development, resulting in significant air pollution.

A total of 22 toxic chemicals were detected in nine air samples, including four carcinogens, toxins known to damage the nervous system and respiratory irritants. The levels were between three to 3,000 times higher than levels established by public health agencies to estimate increased risk of serious health effects and cancer based on long-term exposure. Carcinogens include the toxic BTEX: benzene, ethylbenzene, xylene, were found at levels up to hundreds of times more concentrated than safe levels. As well as high levels of the toxic BTEX, two other known carcinogens were found at very high levels, acrylonitrile and methylene chloride. Hydrogen sulphide, causing respiratory illnesses, nausea and mental symptoms, has been found at 185 times the level recommended as safe by the U.S. EPA.

These results demonstrate that local communities, workers and the environment are at risk of exposure to multiple chemicals from natural gas operations. At the levels detected, the individual exposures can cause an increased risk of cancer and other serious health effects as there are no health-based standards for exposure to multiple chemicals either in US or Australia.

The report identified the following priority sources of exposure:

- **Air emissions from fracking compounds**

Air pollution caused by fracking compounds during their use, storage, or waste disposal.

- **Pits**

Waste from drilling, fracking, or production, which may be stored or disposed of in open-air pits to allow some of the toxic material to evaporate into the air.

- **Land application (including land farming)**

Waste from drilling, fracking, or production may be spread on the ground or otherwise applied to the land (e.g. sprayed as dust suppression on roads).

- **Flaring**

Unwanted gases in the exploration and production processes are burned off in the open air using flares. These produce toxic gases as a result.

- **Venting**

During various stages of gas exploration, production and maintenance, gases are vented directly into the air rather than contained or flared. Venting can release large volumes of toxic gases.

- **Fugitive emissions**

Leaks in pumps, valves, compressors, pipes and tanks can result in insignificant air pollution releases because of the large number of components in gas processing.

- **Compressors**

Where the gas from the wells is collected and then compressed into smaller volumes, the compressors may release a range of toxic gases.

- **Condensate tanks**

Some wells produce semi-liquid gases along with natural gas that are stored in tanks, which can leak various toxic gases.

- **Dehydrators**

These systems are needed to remove water from natural gas and can release toxic gases in the process.

- **Gas processing plant**

The last stage of gas production involves the refining of the raw gas into the final product. This occurs at large gas processing plants, which have many sources of air emissions.

- **Additional waste disposal sites**

Wastes from various stages of gas production and processing may be sent to treatment sources including landfills, injection sites and wastewater treatment sites, which can also release air pollution.

The air pollution identified in this report indicates an urgent need for all current natural gas development sites including well pads, compressors, gas plants, and waste sites to undergo continuous monitoring for volatile organic compounds and hydrogen sulfide and to provide that data to regulators and the public. Those facilities unable to eliminate toxic emissions should be shut down.

A Cornell University study suggests that the fugitive emissions (methane that escapes into the atmosphere during the production of gas) created in Shale Gas production in the US was so significant as

to potentially make the carbon footprint of shale gas larger than coal when used for electricity generation. The processes for Shale Gas extraction are similar to those used for coal seam gas.

The fracturing used to extract coal seam gas, otherwise known as coal-bed methane is technically different from methods employed in extraction of shale gas, both of which have generated major controversy around the globe. But the harmful impacts of coal seam gas and shale gas being alleged by landholders in the USA, Australia and around the world are largely the same. Australia does have large deposits of shale gas so is it just a matter of time before that becomes another big problem?

Methane is twenty times more greenhouse potent than CO₂ over a hundred year timescale which pushes up its carbon equivalent footprint. It is even worse if it is turned to LNG for export because a significant portion (around 10%) of the gas is used in the refrigeration process to liquefy the gas.

The Bakers' 1050 hectare property and lifestyle 35km west of Dalby on the Darling downs is one of many that has been destroyed by mining companies. Ancient trees have been replaced by power lines and methane migration has undermined the health of family members. One kilometre down the road, at Tom O'Connor's cattle and grain farm, one of 12 coal seam gas wells on his property erupted, sending methane and water spewing nearly 100 metres into the air. It took Arrow Energy 27 hours to cap the well, and this was the fourth incident on O'Connor's farm to date.

Natural gas extraction has greatly increased since the introduction of directional drilling and hydraulic fracturing technologies. In various places throughout the world where these techniques are being practiced, there is systematic evidence for contamination of drinking water by methane. Concerns for impacts to groundwater resources are based on (i) fluid (water and gas) flow and discharge to shallow aquifers due to the high pressure of the injected fracturing fluids in the gas wells; (ii) the toxicity and radioactivity of produced water from a mixture of fracturing fluids and deep saline formation waters that may discharge to the environment; (iii) the potential explosion and asphyxiation hazard of natural gas; and (iv) the large number of private wells in rural areas that rely on shallow groundwater for household and agricultural use that are typically unregulated and untested. Studies have found methane concentrations were 17-times higher on average in shallow wells from active drilling and extraction areas than in wells from non-active areas.

A different potential source of shallow groundwater contamination associated with gas drilling and hydraulic fracturing is the introduction of hypersaline formation brines and/or fracturing fluids. The majority of this fracturing water typically stays underground and could in principle displace deep formation water upward into shallow aquifers. The process of hydraulic fracturing generates new fractures or enlarges existing ones above the target rock formation, increasing the connectivity of the fracture system. The reduced pressure following the fracturing activities could release methane in solution, leading to methane exsolving rapidly from solution, allowing methane gas to potentially migrate upward through the fracture system. Fracturing wastes are not regulated as a hazardous waste under the Resource Conservation and Recovery Act, fracturing wells are not covered under the Safe Drinking Water Act, and only recently has the Environmental Protection Agency asked fracturing firms to voluntarily report a list of the constituents in the fracturing fluids based on the Emergency Planning and Community Right-to-Know Act.

I sincerely urge the Government to ban hydraulic fracturing in the interests of the people and the future of Australia. Anything less is tantamount to planetary murder. What will be your Government's legacy for the future?

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