

**Submission
No 415**

INQUIRY INTO COAL SEAM GAS

Organisation: The People Project Inc

Date received: 19/09/2011

Submission for the NSW Parliament's coal seam gas Inquiry

On behalf of The People Project

Thank you for the opportunity to provide input into the inquiry into coal seam gas currently being conducted by the NSW Legislative Council's General Purpose Standing Committee No 5.

In This submission, The People Project will address the entire Terms of Reference, with focuses on specific areas, and very concise comments on others.

Please accept the comment on the environmental and health impact of CSG activities as follows:

Term of Reference 1

Coal seam gas mining represents a serious threat to water resources due to:

-The potential for drawdown and contamination of groundwater aquifers, including potential for major cumulative impacts on the Great Artesian Basin.

The Great Artesian Basin (GAB) is a resource of national importance. It lies under 22% of Australia and is the only reliable source of water in arid and many semi-arid areas. GAB springs support rare plants and animals found nowhere else. Some are found only in a single spring. These springs rely on flows from GAB aquifers. Extracting large amounts of water to allow coal seam gas to flow will reduce the pressure in adjoining aquifers and flows to some streams will be affected. There is likely to be "*a significant impact*" on threatened species that live only in GAB springs (1).

-Consequential effects due to the use of chemicals, such as the pollution of surface water systems from chemicals in the 'waste' water, leading to very serious reductions in water quality, impacting on both the environment and the water used for human consumption.

-The use of large volumes of water for drilling and fracking in water systems that are already over-allocated, such as the Murray-Darling Basin.

-Unlimited water extraction – no restrictions - The Coal Seam Gas industry is predicted to extract up to 350,000 ML of groundwater per year – that's equal to about two-thirds of Sydney Harbour or the size of Somerset Dam! And yet, there are no laws preventing an unlimited take of this water. CSG companies are exempt from complying with the Great Artesian Basin Resource Operations Plan (2).

-The location of coal seam gas wells on sensitive floodplains and in water catchments.

Examples:

Discharge of treated 'waste' water by Eastern Star Gas into a creek in the Pilliga (3); location of coal seam gas wells on the floodplain at Casino; exploratory drilling near Woronora Dam in water catchment area of Sydney and the Illawarra; drilling near the Tomago sandbeds water catchment area in the Hunter.

Coal seam gas mining produces vast quantities of waste that represent a serious environmental risk:

-management of waste water is highly problematic and leads to environmental degradation where storage, leakage, spillage and discharge occurs.

-Treatment of waste water results in the production of a highly concentrated 'brine' by-product, which is extremely difficult to dispose of without causing harm to the environment.

Examples:

Spillage of waste water leading to extensive tree death in the Pilliga (4); deliberate discharge of saline water leading to the pollution event near Broke; native animal deaths at drill ponds in the Pilliga.

Case Study:

The Pilliga forest in NSW is the largest temperate woodland in eastern Australia. It covers more than 500,000 hectares and is home to threatened species such as the Regent Honeyeater and the Pilliga Mouse. It also helps recharge the Great Artesian Basin.

Eastern Star Gas plans to drill 1,100 gas-wells in the Pilliga. With each well requiring clearing for a 1 hectare pad, an all-weather access road and a corridor for gas and water pipelines plus waste water storage ponds and other infrastructure such as condensers and compressors, the forest will be fragmented. A nationally significant bush icon will become an industrial wasteland.

Gas pipelines will run from the Pilliga along environmentally sensitive Traveling Stock Routes to a liquid natural gas (LNG) export terminal in the Hunter estuary. The Hunter estuary's Ramsar-listed wetland is also at risk.

Eastern Star Gas appears to have the attitude that "If the Government Departments responsible for checking and policing the possible Environmental Effects of their operation, do not pick-up that the operation may have a bad environmental outcome and sign off on the proposed program then it is alright to do that part of the operation that way because they have permission to do so". This can be borne out in the announcement of Mr P Fox when he continually reminds us that Eastern Star Gas "takes its Environmental Responsibilities seriously" (5).

The following is some visual examples of the Environmental damage that has been found in the Pilliga State Forest. These examples have a time span from 2000 to 2010, and Eastern Star Gas, through takeovers is responsible to repair that damage, but as can be seen nothing has been done.



(Source: <http://sore.net.au/558/eastern-star-gas-and-the-environment>)

The Pilliga Forest is home to a host of threatened species, including the Pilliga Mouse and the Regent Honeyeater. Many of these species are listed under the federal *Environmental Protection and Biodiversity Conservation Act* (6).

When a company wants to develop a project on a site with nationally listed threatened species, they are required by law to refer the project to the federal environment department.

Eastern Star Gas has been exploring for and producing coal seam gas in the Pilliga Forest since 2004. This has resulted, amongst other actions, in the clearing of 150 hectares of forest, fragmentation of a further 1700 hectares, and the dumping of waste water into creeks (7).

As the Eastern Star Gas has impacted threatened species habitat, and should have sought federal environmental assessment for its operations. All current and proposed activities should be suspended, and assessed by the Commonwealth Environment Department.

“Uncontrolled and irresponsible growth in coal seam gas exploration and extraction across our state risks bleeding our communities and natural environments dry,”

- CEO Pepe Clarke, Nature Conservation Council of NSW.

Coal seam gas mining represents a major threat to natural areas:

-It leads to extensive clearing and fragmentation of native bushland and threatened species habitat

-It increases the risk of catastrophic bushfires.

-It represents a critical threat to wetland systems, even distant ones that are hydrologically connected.

-It transforms major vegetation remnants, refuges and corridors into industrial zones.

-Even protected areas and public lands are not safe, as coal seam gas mining can occur in areas bordering National Parks, and is permitted in State Conservation Areas and State Forests.

Examples:

Pilliga coal seam gas mining will clear at least 2,400 hectares and fragment 85,000 hectares of public lands, including State Forests and State Conservation Areas; at Putty drilling is planned next to the World Heritage-listed Wollemi National Park; at Pogy, drilling is occurring on an inholding in Goulburn River National Park, in north-west NSW, Travelling Stock Routes are targeted for drilling and gas pipeline infrastructure; in the north-east, a pipeline is proposed through the World Heritage-listed Border Ranges National Park.

Coal seam gas mining poses a serious risk to human health:

-Due to contamination of water used for human consumption and agricultural production with chemicals used in drilling or fracking as well as those present in the coal seam.

-From leakage of toxic methane and other gases during gas production and migration of methane into water supplies.

-Through poor management of chemicals and use of toxic chemicals without full disclosure, particularly during fracking and drilling.

Examples: *The recent foamy discharge from a well at Camden; methane leaking from gas pipelines and a water drain in the Pilliga and from well-heads at Casino.*

There are many hazards involved with CSG extraction. CSG wells and pipelines are fire and explosion hazards. Over 50% of wells tested in Queensland leak methane. Many landholders have reported instances of methane in their stock watering bores and even household taps.

Investigations in USA have revealed serious effects from volatile organic compounds (VOCs), poly-aromatic hydrocarbons (PAHs), heavy metals (eg uranium, lead, mercury) and other compounds naturally present in coal seams. These may be brought to the surface via leaks or in the associated water. Of the compounds typically released, 25% are carcinogenic; 37% affect the endocrine system; 52% affect the nervous system; 40% affect the immune system; and 100% affect the respiratory system. Many compounds affect several systems whether drunk in contaminated water or inhaled.

The chemicals used in coal seam gas mining are of extremely high risk to human health:

This is a list of some of the chemicals used in fracking fluids in Australia.

(Source: APPEA, 1 November 2010.

www.appea.com.au/images/stories/mb_files/APPEA_fracking_chemicals.pdf)

Chemical, fracking use.	Common use example	Hazards, safety notes
1-Propanol. Complexor.	Used as a solvent in the pharmaceutical industry.	Hazardous chemical class 3 ^[1] . Highly flammable. Harmful by inhalation and if swallowed. Irritating to eyes and skin.
2-Butoxyethanol. Surfactant (used to reduce surface tension).	Used in whiteboard cleaners, liquid soaps, cosmetics and lacquers.	Poison. Causes hemoglobinuria as well as histopathologic changes in the liver and kidney. ^[2]
Acetic Acid. pH buffer (used to adjust pH).	Gives vinegar its taste.	Extremely corrosive and flammable. It requires special storage and handling considerations. Glacial acetic acid causes severe chemical burns to eyes and skin. ^[3]
Acrylic copolymer. Lubricant.	Used as a soil-repellent coating by the building industry.	Includes methyl methacrylate, methacrylic acid, butyl acrylate and buthyl methacrylate, all <u>toxic</u> chemicals used in solvents. ^[4]
Ammonium persulfate. Breaker. Used to reduce viscosity (turns a gel into water)	Used in hair bleach, blot gels and glass cleaning products.	Oxidizer with moderate oral toxicity. Airborne dust may be irritating to eyes, nose, lungs, throat and skin upon contact. ^[5]
Boric Acid. Crosslinker to increase viscosity.	Used in antiseptics to treat cuts and fungal infections (athlete's foot).	Poison. Chronic poisoning occurs in those who are repeatedly exposed to boric acid. Once used to disinfect and treat wounds, patients who received such treatment repeatedly got sick, and some died. ^[6]
Boric Oxide. Crosslinker to increase viscosity. Disodium Octaborate Tetrahydrate.	Used to produce high strength alloys, glasses and ceramics.	Causes severe irritation of upper respiratory tract with coughing, burns, breathing difficulty, and possible coma. May cause kidney injury. ^[7]
Gelling agent/Crosslinker to increase viscosity.	Used as a fertilizer.	Affects the gastrointestinal tract, skin, vascular system and brain. ^[8]
Hydrochloric Acid. Cleaning of the wellbore prior to fracking.	Used to clean swimming pool filters.	Extremely corrosive. Inhalation of vapour can cause serious injury. Ingestion may be fatal. Liquid can cause severe damage to skin and eyes. Threshold Limit Value - 5 ppm. Lethal to fish from 25 mg/l or more. Toxic for aquatic organisms due to pH shift ^[9]

Chemical, fracking use.	Common use example	Hazards, safety notes
Methanol. Surfactant. Used to aid gas flow.	A type of alcohol, can be used in wastewater treatment and as an alternative fuel	Swallowing even small amounts has potential to cause blindness or death. Effects of sub lethal doses may be nausea, headache, abdominal pain, vomiting and visual disturbances ranging from blurred vision to light sensitivity. Repeated exposure by inhalation or absorption may cause systemic poisoning, brain disorders, impaired vision and blindness and worsen conditions such as emphysema or bronchitis. [10]
Ethylene Glycol Monobutyl Ether. Mutual solvent.	Used in household cleaners, fire fighting foam, and to degrease bowling pins and lanes.	Liquid and vapour are combustible. Harmful if inhaled, when in contact with skin and if swallowed. It is irritating to respiratory system. Causes eye irritation, affects central nervous system, blood and blood forming organs, kidneys, liver and lymphoid system. [11]
Muriatic Acid. Used for cleaning the well bore.	Leather tanning and for cleaning.	Irritating and corrosive to living tissue. Brief exposure in low levels produces irritation. Exposure to higher levels can cause breathing difficulties, narrowing of the bronchioles, blue colour of the skin, accumulation of fluid in the lungs and death. [12]
Potassium Chloride. Clay inhibitor. Polydimethyldiallylammonium chloride. Clay control. Quaternary Polyamines. Clay control.	Used in making fertilizer, gas-welding flux, in medicines and for lethal injections. Flocculant in waste water treatment. Wetting agent, shampoo ingredient. Used in waste water treatment	Large doses cause gastro-intestinal irritation, purging, weakness and circulatory problems. [13] Avoid runoff into storm sewers and ditches. [14] Corrosive, dangerous for the environment. Risk of serious damage to eyes. Very toxic to aquatic organisms. Vapours may cause drowsiness and dizziness. [15]
Sodium Borate. pH buffer.	A component in glass, pottery, and detergents.	Eye irritation, blurred vision, eye damage. [16]
Sodium Hydroxide. pH buffer.	Used in paper-making, food processing, soap, detergents, drain cleaners.	Causes severe skin and eye burns. May cause blindness; severe and permanent damage to gastrointestinal tract including burns, perforations [17] . Inhalation may lead to chemical pneumonitis, pulmonary edema. Causes severe irritation of, and possible chemical burns to upper respiratory tract – coughing, burns, breathing difficulty. Possible coma.
Tetrakis (hydroxymethyl) Phosphonium Sulfate. Antiseptic.	Used to eliminate bacteria in water, petroleum.	Prolonged or repeated skin contact may cause dermatitis, liver and kidney damage. [18]
Tetramethyl ammonium chloride. Clay control.	A salt of ammonia. Few common applications.	May be fatal if swallowed. Causes dizziness, nausea, shortness of breath, severe hypotension, shock. A known ganglionic blocking agent, causing vasodilation, and curare-like actions, peripheral nerve damage, cardiac paralysis, dyspnea, effects, hypotension. [19]

Other major environmental problems with CSG mining include:

-Coal seam gas exploration and extraction is a destructive process, the remediation of which is not satisfactorily addressed through the NSW Petroleum (Onshore) Act 1991.

-The low level of remediation required under the Act does not address the large environmental impact, particularly the cumulative impacts across the landscape. This could lead to irreversible damage to our natural systems and waterways when combined with the CSG industry's poor management of remediation, or even its complete failure.

The Act = the NSW Petroleum (Onshore) Act 1991

Remediation required under the Act:

The Minister for Resources and Energy is currently responsible for addressing proposed environmental impacts under the Act [Part 6, Division 1] before granting a mining title, however the conservation and protection of the environment is broadly defined.

Nevertheless, the following division [Part 6, Division 2] does not make it compulsory for the “conditions subject to which a petroleum title is granted or renewed” to include conditions relating to this protection of the environment. Neither compulsory is the inclusion of conditions related to “(a) the rehabilitation, levelling, regrassing, reforestation, or contouring of any part of the land the subject of the [mining] title that may have been damaged or adversely affected by operations and (b) the filling in or sealing of excavations and drill holes”. The Minister can even “alter any such conditions” if considered “inadequate”.

Therefore, the threats of connivance, laxity, and ineffectiveness of remediation may rise from the requirements set out in the Act itself.

Example: *In Casino where drill ponds had not been remediated; and in the Pilliga where there has been no rehabilitation of well-pads.*

Furthermore:

-The fact that regulatory processes, including assessment, approval and compliance, are all drastically inadequate – this was evident in the approval of the Gloucester AGL project, without details about what it entailed, and the lack of resources or political will to enforce compliance in the Pilliga.

-Coal seam gas is a fossil fuel and a significant source of greenhouse gas pollution. A methane leakage rate of 3% of total well production cancels out any emissions advantage gas has over coal. The latest research conservatively estimates a methane leakage rate of 3.6% - 7.9% of total well production. Over 20 years, this gives CSG a greenhouse gas footprint at least 20% greater than coal (9). It generates more than 40 times the amount of greenhouse gas per unit of energy generated than solar or wind. Coal seam gas will make a major contribution to global warming, particularly when fugitive emissions and liquefaction prior to export are fully considered.

Term of Reference 2

CSG Mining causes major social impacts:

-landholders face the prospect of losing control of their land, and property values are degraded and options for re-sale lost once exploration licenses are issued.

-The social fabric of communities is drastically weakened, with evidence that communities dominated by fly-in/fly-out workers show higher incidence of violence and crime, soaring rents and worsened mental health outcomes.

The rapid expansion of the CSG industry looks set to have major economic impacts:

-It is likely to impact negatively on a whole range of other industries such as organic farming, tourism, vineyards, and orchards.

-Food security is threatened by risks to groundwater and loss of arable land.

-It leads to important local infrastructure, such as roads, being run-down and damaged at a cost to the taxpayer.

-It is undermining economic diversity and leading to a skills shortage in other rural industries, and can lead to collapse of businesses unable to compete for staff.

***Examples:** Pipelines threaten to cause major erosion to self-mulching black soil plains around Mullaley; Food security is threatened by CSG mining proposals on the Liverpool Plains, around Moree and Bellata; and coal seam gas mining poses a potential threat to the vital hot springs tourist attractions from Pilliga to Moree.*

Other socio-economic issues with coal seam gas mining include:

-Local Government and local communities are currently largely excluded from the planning process and public participation and legal standing is inadequate.

-Royalties paid to the state create an expectation that projects will be approved, whilst failing to deliver sufficient funds to offset the impact of coal seam gas mining.

Term of Reference 3

-The People Project believes that CSG is not at all required to meet the future energy needs of NSW. Our view is that the renewable energy industry is the most logical and sustainable industry to meet the future energy needs of NSW.

-And regarding meeting the local energy needs of NSW, is it not true that most gas in NSW is extracted for export?

-There is a lack of information about the whole-of-lifecycle emissions for CSG production. Studies in the United States suggests unconventional gas has huge fugitive emission impacts.

-The People Project's view on the CSG industry is that it does *not* contribute to delivering energy security, as coal seam gas is an un-renewable resource, with critically serious long-term and large-scale impacts on Australia's natural environment.

-Is it not true that the massive expansion in coal seam gas production in NSW is delaying the transition to renewable energy alternatives?

-In the short-term, the CSG industry may seem to have economic benefits, such as the mining companies supplying the Government with money from their superfluity of finances.

-But in the long-term, the drastic environmental consequences of this industry nullify any short-term economic gain as coal seam gas is an energy source which evidently and unfortunately leads to major destruction and poisoning of the environment, thus the economy, as the economy itself is reliant on the environment.

-The People Project suggests the solution of renewable energy, such as solar thermal, which would thus deliver energy security on a long-term scale. There are vast solar thermal resources in the major areas where CSG is now proposed, e.g. Narrabri and Moree.

Term of Reference 4

-The People Project are often told by various Australian citizens, who take the liberty in voicing their sincere concerns, claiming that coal seam gas mining companies "bribe" the Government so that the mining companies are thereafter allowed to be exempt from relevant environmental legislation. We have not yet done any thorough research into such a claim, but when we do, we hope to find out if this is true.

-Regarding the interaction of the NSW Petroleum (Onshore) Act 1991 with other legislation, coal seam gas mining is exempt from a number of other environmental statutes, including the Native Vegetation Act 2003 and the Water Management Act 2000.

-Legislation controlling activities on public lands are inadequate to prevent coal seam gas mining, which when approved effectively privatises public lands.

-Interaction with federal legislation at the exploration phase is poorly understood and not enforced.

Example: extensive exploration in the Pilliga without getting federal approval.

Term of Reference 5

The impact similar industries have had in other jurisdictions:

In Queensland:

-Significant problems with leaking wells.

Over 50% of wells tested in Queensland leak methane. Many landholders have reported instances of methane in their stock watering bores and even household taps (8).

-Risk of inter-aquifer transfer and concerns about poor drilling operations and supervision with up to 40,000 wells within the Surat Basin region alone.(9)

-Impacts on ground water evidenced from drops in bore levels.

-Growing social discord.

-An exploding well at Dalby;

News story about the exploding well: (Source: <http://www.theaustralian.com.au/news>)

A LEAKING coal seam gas well west of Brisbane has been plugged.

The gas well, west of Dalby, began leaking yesterday while Arrow Energy, the company which operates the well, was preparing it for gas production.

The well was uncapped to install a pump when water and gas burst to the surface.

Greens spokeswoman Libby Connors said water and gas exploded up to 100 metres high.

Contractors at the scene were not hurt and a 100m exclusion zone was established around the well on a farmer's property off Kogan-Condamine Road.

The company is now investigating the cause of the leak, which is expected to take about two weeks.

Friends of the Earth spokesman Drew Hutton said it was the fourth leak on the property.

"Over the last 18 months we have seen pipeline blowouts, gas migrations and well blowouts in the Daandine-Wilkie Creek area," Mr Hutton said.

"How much longer do we have to put landowners' and workers' lives at risk in an unsafe industry? (10).

-Major impacts on natural values near Gladstone.

-Alienation of farmland.

-Extensive clearing and fragmentation of native bushland and threatened species habitat.

***Example:** Coal seam gas pipelines will run along environmentally sensitive areas to a liquid natural gas (LNG) export terminal. The LNG export terminal on Curtis Island will mean the loss of regionally significant remnant vegetation and added risks for the critically endangered Yellow Chat. The project lies in World Heritage-listed waters and will require dredging of the **Great Barrier Reef** lagoon. Turtle habitats, sea-grass meadows that support dugongs and nationally important wetlands are all threatened (11).*

“Coal seam gas mining should not be allowed to go ahead until environment, water supply and other risks are appropriately assessed and regulated”.

-CEO Pepe Clarke, Nature Conservation Council of NSW

Solutions

Concluding Recommendations

- 1. A full Moratorium on all forms of coal seam gas mining until the environmental, social and health impacts have been rigorously and independently assessed.**
- 2. Coal seam gas exploration and mining to be made subject to all environmental legislation, including the native vegetation and water management laws.**
- 3. The provision of standing to ensure that the community has full legal rights to challenge and enforce environmental laws under which coal seam gas companies are operating.**
- 4. The provision of a right in the Petroleum (Onshore) Act to allow landholders to refuse consent for coal seam gas exploration or production on their land.**

- 5. A prohibition on coal seam gas exploration and mining in important bushland, valuable farmland, groundwater aquifers, residential areas and public lands.**
- 6. A requirement that all chemicals used in coal seam gas drilling or fracking must be assessed by the chemical regulator for use for that purpose before being approved for use.**

End

**Yours sincerely,
Anandan Mcewen
Co-Founder
The People Project Inc.**

References:

- (1) Water Group Advice (to Minister Burke) on EPBC Act Referrals, QGC referral - 2008/4399; Santos-Petronas referral - 2008/4059 and AP LNG referral - 2009/4974
- (2) <http://www.basinsustainabilityalliance.org/groundwaterimpacts.html>
- (4) <http://sore.net.au/558/eastern-star-gas-and-the-environment/>
- (5) <http://sore.net.au/558/eastern-star-gas-and-the-environment/>
- (6) <http://www.wilderness.org.au/campaigns/coal-seam-gas/under-the-radar-new-report-lifts-the-lid-on-eastern-star-gas-operations>
- (7) <http://www.wilderness.org.au/campaigns/coal-seam-gas/under-the-radar-new-report-lifts-the-lid-on-eastern-star-gas-operations>
- (8) <http://lockthegate.org.au/csg-facts/csg-factsheet.cfm>
- (9) <http://www.basinsustainabilityalliance.org/groundwaterimpacts.html>
- (10) www.theaustralian.com.au/...coal-seam-gas-well.../story-e6frg6nf-
www.appea.com.au/images/stories/mb_files/APPEA_fracking_chemicals.pdf
- (11) <http://lockthegate.org.au/csg-facts/csg-factsheet.cfm>

References of some of the chemicals used in fracking fluids in Australia:

- [1] www.phmsa.dot.gov/staticfiles/PHMSA/DownloadableFiles/Files/erg2008_eng.pdf
- [2] www.csr.com.au/msds/MSDS/n-Propanol.pdf
- [3] www.valdezlink.com/inipol/pages/2-butoxy_msds.htm
- [4] www.lyondellbasell.com/techlit/techlit/3324.pdf
- [5] las.perkinelmer.com/content/ApplicationNotes/FAR_GCMSAcrylicCopolymerPyr.pdf
- [6] www.hillbrothers.com/msds/pdf/n/ammonium-persulfate.pdf
- [7] www.nlm.nih.gov/medlineplus/ency/article/002485.htm
- [8] <https://securesearch.acros.com/msds?for=acros&sup=acros&lang=UK&search=206300010>
- [9] www.pesticideinfo.org/Detail_Chemical.jsp?Rec_Id=PC35343
- [10] msds.chem.ox.ac.uk/HY/hydrochloric_acid.html
- [11] www.methanex.com/products/documents/MSDS_USenglish.pdf
- [12] www.ppci.com.ph/msds2k10/04_egmbe.pdf
- [13] hubpages.com/hub/What-is-Muriatic-Acid
- [14] www.flocculants.info/Gmsdsdmdac20.pdf
- [15] www.broadleyjames.com/PDFs/msds-kcl-h2o.pdf
- [16] [duoclean.de/web/WebE.nsf/0/346FD2D62F6D8F56C12577E500364F78/\\$FILE/neoseptal%20plus_GB-en_2009-10-19-PN2158.pdf](http://duoclean.de/web/WebE.nsf/0/346FD2D62F6D8F56C12577E500364F78/$FILE/neoseptal%20plus_GB-en_2009-10-19-PN2158.pdf)
- [17] www.transgenomic.com/lib/msds/CAR990061.pdf
- [18] www.certified-lye.com/MSDS-Lye.pdf
- [19] www.caledonlabs.com/upload/msds/8650-5e.pdf