Submission to Review of coal seam gas activities in NSW .

Beth Williams to: csg.review 25/04/2013 09:14 PM

History: This message has been replied to and forwarded.

To the NSW Chief Scientist & Engineer,
csg.review@chiefscientist.nsw.gov.au

Re Review of coal seam gas activities in NSW

I write as a botanist and long-term environmentalist, with a particular interest in the Pilliga forests currently under threat of mining by Santos for coal seam gas (CSG)

Like others I am horrified at Santos' plans for a huge gasfield with up to 1100 wellheads and associated infrastructure such as access roads, pipelines, waste water storage dams and a processing and compression plant, all likely to cause serious fragmentation of this sensitive and irreplaceable high conservation value environment.

As a member of the National Parks Association of NSW and the Northern Inland Council for the Environment (NICE) and a wide coalition of environmental groups I am extremely concerned at proposals for CSG mining in the Pilliga, which is used as a field study site by the Botany Department, University of New England, and which has recently been identified as an iconic high conservation area in the NSW Government's strategic regional land use mapping.

I will present to you information on matters of compliance and monitoring gathered by inspection over a number of years, with attached documents of some more recent information gathered by members of NICE, the Wilderness Society and Lock the Gate Alliance networks.

I ask you to pay particular attention to the Pilliga in your review of CSG mining with respect to compliance and monitoring, and to fugitive emissions and to water matters.

Eastern Star Gas (now taken over by Santos) has failed to comply with requirements of its exploration licence PEL 238 and PAL 2, with breaches detected by conservationists in the Pilliga forests on many occasions since 2003. There has been virtually no monitoring or action by Government agencies to control pollution until repeated publicising of incidents by conservation activists. See attachment Pilliga coal seam gas developments breach Federal environmental law.

Incidents include leakage or overflow of contaminated salty water from holding ponds or leaky pipes causing death and damage to areas of trees around exploration well heads. These have not been monitored for compliance or remediated, even though reported to the State Pollution Control Commission and its successor the EPA. When reports were finally accepted the only action was a warning and/or a minimal fine for breaches of water pollution standards.

In November 2011 Santos took over Eastern Star Gas with promises to upgrade ESG's processes and employ better environmental standards and performance, but independent tests showed highly toxic water still leaking into Bohena Creek (a tributary of the Namoi) in 2012. See attachment Arsenic lead found in toxic coal seam gas spill.

Santos' public relations folk have admitted that leaks occurred, but have attempted to play them down, and claim minimal impact. This should not be accepted without further detailed investigation. Toxic water released from CSG mining operations is likely to have severe effects on the environment, on local and underground water supplies and recharge areas of the sub artesian basin, and on the Murray Darling Basin system. See attachments Pilliga coal seam gas developments breach Federal environmental law, and Gas Company Data Confirms Water Quality Problems Pilliga, and NEW DATA TREATED COAL SEAM GAS

WATER THREAT TO RIVERS See also attached Submission 0202.pdf - a submission to Inquiry into Coal Seam Gas by Dr Mariann Lloyd-Smith and Joanna Immig, Coordinator, National Toxics Network, on behalf of the National Toxics Network Inc.

There is a serious lack of scientific data relating to fugitive emissions and the likely effects of fracking on water systems, as well as impacts on human health, water catchments, and the environment. I request that you seek out or commission truly independent sources of information in order to develop fact sheets not relying solely on information promoted by industry.

There are also serious gaps in the identification and management of risks arising from coal seam gas exploration, assessment and production, particularly as they relate to human health, the environment and water catchments. One of the most serious risks In the Pilliga is of horrendous wildfires being exacerbated by siting highly flammable gas wells with possible gas leaks and high levels of fugitive emissions in extremely fire-prone vegetation already subject to lightning-ignited bushfires.

I hope the above and the following attached documents from our network will assist you in evaluating the available evidence to make recommendations on these matters in your report into coal seam gas activities in NSW. See attached docs Water and Salt CSG operations, New mapping shows Pilliga Forest likely to depend on groundwater, Fracking, Fugitive emissions message sent 15 9 2012.

I apologise for the large number of attachments, but it seems to be the easiest way to provide you with some of the large amount of information possessed by our environmental network. I hope the information will be of assistance to you in your task of reviewing coal seam gas operations in NSW.

Compiled by Beth Williams BSc, Hons in Botany, University of Sydney. 25th April 2013
25 The Avenue, Armidale 2350 phone 02 6772 4454

Pilliga coal seam gas developments breach Federal environmental law.docx

Arsenic lead found in toxic coal seam gas spil1.docx

Gas Company Data Confirms Water Quality Problems Pilliga.docx

NEW DATA TREATED COAL SEAM GAS WATER THREAT TO RIVERS.docx Submission 0202.pdf

Water and Salt CSG operations.docx New mapping shows Pilliga Forest likely to depend on groundwate1.docx

Fracking.docx Fugitive emissions message sent 15 9 2012.docx

RE: Submission to Review of coal seam gas activities in NSW .
Beth Williams to: csg.review 27/04/2013 12:48 PM

History: This message has been forwarded.

I copied it from internet message, and I can't open the attachment either. Here's message I accessed on the internet, and I have opened the file online from clicking Submission 0202… as below

I also attach an extract from the open pdf doc copied into Word docx. Hope this helps.

1. PDF]
Submission 0202.pdf - Parliament of New South Wales - NSW ...
www.parliament.nsw.gov.au/Prod/parlment/.../Submission%200202.pdf
o Cached
Sep 6, 2011 – Dr Mariann Lloyd-Smith and Joanna Immig, Coordinator, National Toxics. Network, on behalf of the National Toxics Network Inc. September ...

Beth Williams, phone 6772 4454

From: rebecca.radford@chiefscientist.nsw.gov.au [mailto:rebecca.radford@chiefscientist.nsw.gov.au]
On Behalf Of csg.review@chiefscientist.nsw.gov.au
Sent: Friday, 26 April 2013 12:50 PM
To: bethwillms@optusnet.com.au
Subject: Re: Submission to Review of coal seam gas activities in NSW.

Dear Ms Williams

We are unable to open the pdf document titled 'Submission'. We are getting a message that the file is damaged - can you please re-send a different version?

Many thanks
Rebecca Radford

From: "Beth Williams" <bethwillms@optusnet.com.au>
To: <csg.review@chiefscientist.nsw.gov.au>
Date: 25/04/2013 09:14 PM
Subject: Submission to Review of coal seam gas activities in NSW.

To the NSW Chief Scientist & Engineer,
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[attachment "Pilliga coal seam gas developments breach Federal environmental law.docx" deleted by Rebecca Radford/SRD/NSW] [attachment "Arsenic lead found in toxic coal seam gas spil1.docx" deleted by Rebecca Radford/SRD/NSW] [attachment "Gas Company Data Confirms Water Quality Problems Pilliga.docx" deleted by Rebecca Radford/SRD/NSW] [attachment "NEW DATA TREATED COAL SEAM GAS WATER THREAT TO RIVERS.docx" deleted by Rebecca Radford/SRD/NSW] [attachment "Submission 0202.pdf" deleted by Rebecca Radford/SRD/NSW] [attachment "Water and Salt CSG operations.docx" deleted by Rebecca Radford/SRD/NSW] [attachment "New mapping shows Pilliga Forest likely to depend on groundwate1.docx" deleted by Rebecca Radford/SRD/NSW] [attachment "Fracking.docx" deleted by Rebecca Radford/SRD/NSW] [attachment "Fugitive emissions message sent 15 9 2012.docx" deleted by Rebecca Radford/SRD/NSW]

Extract from Submission 202 pdf.docx

Extract from Submission 202 pdf

Submission prepared by:
Dr Mariann Lloyd-Smith and Joanna Immig, Coordinator, National Toxics Network, on behalf of the National Toxics Network Inc.
September 2011
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National Toxics Network Inc.
The National Toxics Network (NTN) was constituted in 1993 and has charity status. It is a community-based network of experts working on a wide range of toxic chemical pollution issues across Australia, New Zealand and the South Pacific. NTN representatives sit on various national advisory bodies and community consultative committees in relation to international chemical conventions, hazardous waste, contaminated sites, industrial, agricultural and veterinary chemical regulation.
NTN is the Australian focal point for the International Persistent Organic Pollutants Elimination Network (IPEN) and also participates in the work of the international Pesticide Action Network (PAN). NTN is a supporting member group of the Australian Environment Network (AEN), Climate Action Network Australia (CANA) and the Lock the Gate Alliance.
For further details about the National Toxics Network please visit www.ntn.org.au
Dr Mariann Lloyd-Smith
Mariann Lloyd-Smith is a Director of the research group, BioRegion Computer Mapping & Research Pty Ltd (BRCM) and the Co Chair of the International POPs Elimination Network (IPEN), a public interest chemical safety network, representing 800 organisations in over 100 countries.
Mariann gained her PhD from the Faculty of Law at the University of Technology (UTS), Sydney and has worked in the area of chemicals policy and waste management for over two decades. For ten years, Mariann was the coordinator of the National Toxics Network Inc. and now serves as one of its Senior Advisors. Mariann has published widely on chemical issues and was an author of Australia's national management plans for POPs waste.
Mariann was a member of the National Advisory Body on Scheduled Waste, used as a model of participatory democracy in chemical issues. She has been instrumental in the development and implementation of a range of information systems to support environmentally sound chemical management, including the co-development of the model for Australia's National Pollutant Inventory. Mariann is a member of the Technical Advisory Group for the national industrial chemical regulator, NICNAS - National Industrial Chemical Notification and Assessment Scheme. Trained as a negotiator in chemical disputes, she has assisted residents with their negotiations over contaminated land and has participated in the international negotiating committees (INCs) for the Stockholm, Rotterdam and Basel Conventions, the Intergovernmental Forum on Chemical Safety and the Strategic Approach to International Chemical Management (SAICM).

Mariann has presented at UNITAR capacity building and training workshops, both in Geneva and in the Pacific region. Dr Lloyd-Smith is a member of the UN Expert Group on Climate Change and Chemicals and recently coauthored NTN's report on the chemical impacts of hydraulic fracturing in the Australian shale and coal seam gas industry.
For further information contact Dr Mariann Lloyd-Smith: biomap@oztoxics.org

Overview

The National Toxics Network (NTN) welcomes the opportunity to make a submission to the Standing Committee No.5 Inquiry into Coal Seam Gas in NSW. Our expertise is specifically in the area of chemicals, pollution and community engagement so we will provide detailed information on these issues as they relate to the Terms of Reference.

The social and environmental impacts of coal seam gas (CSG) mining are significant issues of concern to communities around the world, including Australians, and specifically the communities and individuals faced with CSG developments in their regions.1

NTN representatives have spoken at public forums on coal seam gas in NSW during 2010/2011 including events in Casino, Murwillumbah, Lismore, Byron Bay and Laurieton where collectively, thousands of citizens have turned out to be better informed about the CSG industry and to voice their concerns about the possible impacts to their individual properties, communities and environment.

NTN produced a technical report (May 2011) titled Hydraulic Fracturing in Coal Seam Gas Mining:The Risks to Our Health, Communities, Environment and Climate. The report is fully referenced and freely available on our website. It is a living document and has been updated several times as new information becomes available. Some of the information provided in this submission is taken directly from the report.

The social and environmental impacts of coal seam gas mining cuts across many challenging areas including: climate change and greenhouse gas emissions; sustainable/renewable energy; chemical use; hazardous waste disposal; air, soil and water pollution; land and water use.

After careful consideration of the chemical pollution issues associated with CSG, NTN recommends that a NSW moratorium be placed on the use of all chemicals involved in the exploration and production of coal seam gas until all of the chemicals used (or proposed for use) have been fully assessed for their health and environmental

hazards and their specific cumulative risks as used in coal seam gas mining. This assessment should be conducted by the federal industrial chemicals regulator the National Industrial Chemical Notification and Assessment Scheme (NICNAS).

1 Stop Coal Seam Gas Now http://www.youtube.com/watch?v=93hRPRxXFg4&feature=related

Key findings

(NB. Not listed by order of priority but as they relate to the Terms of Reference and sequence of information in this submission)

1. The approach to risk assessment in CSG operations on a project-by-project basis does not take into account the cumulative impacts on water and air quality.

2. The disposal of salt and treatment of contaminated produce water is a significant challenge in CSG operations. Limited assessment has been made of the options for treatment and capacity of wastewater facilities and landfills to manage this hazardous waste.

3. Treatment of contaminated produce water using membrane filtration has significant limitations, as it cannot remove all contaminants, particularly organic compounds with low molecular weight.

4. There is no requirement for the assessment and monitoring of the cumulative load of chemicals used in CSG operations, or their potential to contaminate sediment, plants, aquatic species and /or animals prior to release of contaminated produce water. A chemical-by-chemical approach to risk assessment is also in contradiction with the current National Water Quality Management Strategy which recommends moving away from relying solely on chemical specific water monitoring to a more integrated approach using direct toxicity assessments (toxicity bioassays which assess overall toxicity of the water) and biological monitoring to fully assess the cumulative (additive

and synergistic) impacts of complex mixtures of chemicals.

5. NTN's scientific literature review of chemicals used by the CSG industry has found that only 2 out of the 23 most commonly used fracking chemicals in Australia (that we could ascertain) have been assessed by NICNAS, the federal regulator of industrial chemicals. Of the 2 assessed chemicals, neither has been specifically assessed for its use in CSG mining activities.

6. BTEX chemicals are commonly found in the products used in the drilling stage of hydraulic fracturing and BTEX chemicals are also components of the volatile compounds found naturally in the coal gas seams. The fracking process itself can release BTEX from the natural-gas reservoirs, which may allow them to disperse into the groundwater aquifers or to volatilise into air. People may be exposed to BTEX chemicals by drinking contaminated water, breathing contaminated air or from spills on their skin.

7. After hydraulic fracturing is completed, a mixture of hazardous chemical compounds remains underground. These chemicals are distributed over time and space making them difficult and unpredictable to manage into the future, and potentially causing impacts to landscapes and future uses of the land and water.

8. The lack of disclosure on Material Safety Data Sheets of the full chemical identity of chemical ingredients used in products for CSG mining makes it impossible to realistically assess their risks and their possible impacts to the environment and human health.

9. There is an assumption that natural gas derived from CSG can act as a transition fuel because it is a 'cleaner' fossil fuel than coal however, there appears to be limited independent data on which to base this assumption. The total greenhouse gas emissions associated with CSG need to be accounted for in a thorough life cycle analysis.

10. Air pollution associated with CSG sites including emissions from well pads, compressors, gas plants, and waste sites must undergo continuous monitoring for volatile organic compounds and hydrogen sulfide. The data should be provided to regulators and be made publically available. Facilities unable to eliminate toxic emissions should be required to cease operations. All new applications should require a full assessment of the risks and hazards to air quality.

11. CSG exploration and extraction as an industrial activity with a potentially significant impact on the environment and community should require public consultation as part of the authorisation procedure.

12. A cost/benefit analysis should be undertaken for each CSG development and include a full life cycle assessment (including greenhouse gas emission, resource consumption and cumulative impacts) to demonstrate the overall costs/benefits for the society.

Pilliga coal seam gas developments breach Federal environmental law: report
MEDIA RELEASE Tuesday, 19 July 2011

Eastern Star Gas has conducted coal seam gas exploration and production activities in the Pilliga forest without seeking federal assessment on matters of national environmental significance, according to a report by the Northern Inland Council for the Environment, The Wilderness Society and the Nature Conservation Council of NSW.

The report, *Under the Radar* [attached] (and hyperlink) was released today following the recent purchase of Eastern Star Gas by one of Australia's largest domestic gas producers, Santos.

"Eastern Star Gas has undertaken extensive coal seam gas exploration and production without seeking federal approval. This is likely to have damaged the habitat of iconic threatened species such as the Pilliga Mouse and the Regent Honeyeater," said Warrick Jordan, Campaign Manager at the Wilderness Society Newcastle.

"Santos is taking on the most environmentally destructive and contentious gas project in NSW. As the new owner, Santos should look carefully at the damaging impacts of this proposal and immediately desist or refer all existing operations in the Pilliga for proper assessment.

"We are asking Tony Burke to immediately 'call-in' all existing Eastern Star Gas operations in the Pilliga under federal environment laws. Eastern Star should not be able to get away with destroying our natural heritage," he said.

The *Under the Radar* report found coal seam gas operations in the Pilliga have cleared more than 150ha and fragmented 1,700ha of bushland, drilled 92 coal seam gas wells, constructed 56.6km of pipelines, and operated 35 production wells without seeking approval under the Federal EPBC Act. These activities have occurred in habitat for federally-listed threatened species, such as the South-Eastern Long-eared Bat.

"Under Commonwealth legislation, any potential impacts on nationally-threatened species must be referred to the Environment Department for approval. Eastern Star Gas has been flying under the radar to avoid this process in the Pilliga," said Pepe Clarke, CEO of the Nature Conservation Council of NSW.

"Eastern Star has recently applied for Commonwealth approval for a large new coal seam gas field in the same area of the Pilliga as existing operations. If these future operations trigger federal environment laws, then so do the existing operations and Santos should immediately cease those operations and be refer them to the Federal Government"," he said.

"The question remains, will Santos continue Eastern Star's reckless attempts to turn the iconic Pilliga Forest into an industrial coal seam gas field? If Santos can't be trusted to abide by environmental laws now, they cannot be trusted to manage the environmental impacts of NSW' biggest coal seam gas development," said Carmel Flint, of the Northern Inland Council for the Environment.

Full report at:
http://www.wilderness.org.au/files/Under%20the%20Radar%20Eastern%20Star%20Gas%20EPBC%20Report%20email.pdf

Media Contacts:
Warrick Jordan 0451 633 197
Pepe Clarke 0402 325 471

Carmel Flint 0400 521 474

New mapping shows Pilliga Forest likely to depend on groundwater - escalating CSG concerns

Environment groups are calling for plans to extract coal seam gas in the Pilliga forest to be scrapped after the release of a new national Atlas of Groundwater Dependent Ecosystems that indicates all vegetation in the Pilliga is likely to be dependent on groundwater.

The Atlas, released last week and funded by the National Water Commission and hosted by the Bureau of Meteorology, maps the vast majority of the Pilliga as moderate or high 'potential for groundwater interaction'.

The map was released just as the damaging impacts of coal seam gas on groundwater are becoming more widely understood. Even industry bodies have acknowledged the threats, with a report from the Committee for Economic Development Australia (CEDA), A*ustralia's Unconventional Energy Options* 2012, stating that:

Producing unconventional gas, particularly coal seam gas (CSG), is a thirsty business... can cause a variety of water impacts – depleting aquifers and streams connected to those aquifers, changing groundwater quality. (Page 28)

Extracting large amounts of produced water can deplete aquifers and may lower water tables... can also impact on species, ecosystems and water systems that are connected to groundwater. (Page 30)

“The new mapping released last week by the National Water Commission tells us that the Pilliga forest is a fragile environment that is likely to depend on groundwater for its survival" said Naomi Hogan, campaign manager with The Wilderness Society Newcastle.

"Coal seam gas mining represents a known risk to groundwater and thus poses a real threat to the dependent ecosystems of the Pilliga forest - the vegetation and the animals that inhabit it.

“It is clear from this new information that the Pilliga forest, habitat for iconic species such as the Koala and the Pilliga Mouse, is no place for a thirsty and damaging coal seam gas field.

“We are calling on the Federal Environment Minister to put on hold any federal approval of exploration drilling and to instead commission a detailed field study of the groundwater dependent ecosystems in the Pilliga" she said.

Contact:
Naomi Hogan, The Wilderness Society, 0401 650 411

Attachments: Pilliga Map downloaded from the new national Atlas, Federal Government's Media Release on the Atlas

NEW DATA TREATED COAL SEAM GAS WATER THREAT TO RIVERS
MEDIA RELEASE 8 December 2011

*New evidence: treated coal seam gas water poses major water quality problems *
Draft Murray-Darling Basin Plan loophole will allow pollution to continue

Coal seam gas exploration by Santos in the Pilliga Forest near Narrabri is discharging polluted coal seam gas water into the Bohena Creek system which is part of the Murray-Darling Basin, according to independent test results released today by environment groups.

Despite being treated before discharge, the tests show water extracted from the coal seam during mining is responsible for elevated levels of ammonia, methane, carbon dioxide, lithium, cyanide, bromide and boron in the Bohena Creek.Ammonia levels were found to be three times drinking water standards.

"These water samples confirm that coal seam gas water, even after treatment, is of such poor quality that it will degrade the rivers and creeks of the Murray-Darling Basin," said Carmel Flint, spokesperson for Friends of the Earth.

"High levels of ammonia, methane and carbon dioxide pose a major risk to aquatic life, particularly fish" she said.

Prue Bodsworth, spokesperson for The Wilderness Society is concerned by the results. "Coal seam gas mining will worsen river health at a time when we should be doing everything we can to improve it.

"This is another example of the coal seam gas industry running out of control without proper constraints to prevent environmental impacts.This water should not be discharged into pristine environments like the creek systems of the iconic Pilliga Forest" she said.

In its proposed Basin Plan, the Murray-Darling Basin Authority is planning to allow massive increases in groundwater extraction for mining whilst at the same time providing a major loophole in the form of weak water quality targets which it describes as 'aspirational'.

Ms Flint said, "Santos are not even required to obtain a licence to pollute before discharging this water into the creek - there are no adequate controls on pollution under NSW laws during exploration for coal seam gas.

"Furthermore, in its present form, the draft Murray-Darling Basin Plan will do nothing to protect our creeks and rivers from coal seam gas discharge water and its damaging impacts.

"One has to ask whether the weak 'aspirational' water quality targets in the draft Murray-Darling Basin Plan were designed to appease this powerful, dangerous mining industry" she said.

The tests were undertaken by an independent environmental consultant on behalf of the Northern Inland Council for the Environment, Friends of the Earth and The Wilderness Society. A sample from the Santos discharge point into Bohena Creek was compared with an upstream sample.

The test results are available on request. *For interview and to obtain test results*
Carmel Flint Friends of the Earth 0400 521 474
PrueBodsworthThe Wilderness Society 0427 417 870

Gas Company Data Confirms Water Quality Problems Pilliga

MEDIA RELEASE 9 December 2011

It has been revealed today that gas company Santos has its own water sample results showing high levels of ammonia in coal seam gas water being discharged into Bohena Ck in the Pilliga Forest.

The water samples were provided recently by its predecessor, Eastern Star Gas, to the Senate Inquiry into Coal Seam Gas in the Murray-Darling Basin (click to download <https://senate.aph.gov.au/submissions/comittees/viewdocument.aspx?id=6b31e877-2484-496a-b02d-ce98b51d13b5>-
see pp15-18).

Yesterday environment groups released independent water sampling results which showed elevated levels of seven substances, including ammonia, in water being discharged into the creek by Santos.

In response, Santos refused to acknowledge that there were high levels of ammonia in the water and attempted to cast doubt on the reliability of the sample results, stating that/"Santos can make no further comment until the validity of the water sample is confirmed and verified by tests routinely taken by the company"./

"Santos have been exposed today playing games with the truth about what they know in relation to pollution from their produced coal seam gas water" said Carmel Flint, spokesperson with Friends of the Earth.

"Their predecessor Eastern Star Gas recorded levels of ammonia similar to that shown in our results. Their test results from June and July 2011 for the same point at Bohena Ck show levels of 1.7mg/L and 1.3mg/L of ammonia, while our independent sampling results show levels of 1.56mg/L.

"Therefore, Santos' own data shows that the water it is discharging into the Pilliga Forest is poor quality, with levels of ammonia that are up to three times safe drinking water standards. Santos should have admitted this yesterday and come clean with the community instead of playing games and trying to deflect blame to farmers.

Santos also claimed today to be/"confident it is not... having any adverse impact on water resources in the area."/

"Levels of ammonia in the discharged water are fifty two times higher than water upstream -- this is definitely an adverse impact," said Ms Flint

"The gas company samples released to the Senate Inquiry were not comprehensive, only tested for a small range of contaminants and did not provide a comparison with upstream samples.

"Urgent action is needed now by the NSW Government. They should move immediately to prevent any further discharge into this pristine creek system and to enforce pollution control laws.

"The regulatory failures exposed today reinforce the need for a moratorium on coal seam gas mining and for strong, mandatory water quality targets to be included in the Murray-Darling Basin Plan.

For comment and copies of independent test results
Carmel Flint, 0400 521 474

Fugitive emissions message sent 15 9 2012

In NSW, fugitive emissions - leaking of gas from coal mines - already accounts for 20 million tonnes of CO2-equivalent (about the same as the entire NSW transport sector). It's substantially more than the 16 million tonnes from agriculture:
http://www.environment.nsw.gov.au/climatechange/emissionsoverview.htm#DCCEE

This Government website says that NSW coal mine production is forecast to grow strongly over the next decade. Fugitive emissions from coal mining are likely to increase by more than 50% by 2020, suggesting that the total might be 30 million tonnes by then.

Note also, according to the Clean Air Society of Australia and NZ, Australia is likely to be significantly under-estimating fugitive emissions from CSG extraction - equivalent to giving CSG companies a tax handout of $1.5 billion - see below.

This may be another approach to fight the NSW Government's decision to lift the ban on fracking and the moratorium on granting and renewing exploration licences.

Measuring Emissions from Coal Seam Gas

CASANZ September E news www.casanz.org.au

Australia risks underestimating its contribution to climate change if it fails to adequately measure fugitive emissions from coal seam gas wellheads, according to a new report by The Australia Institute. The institute warns that while concerns have been raised about the environmental impact of coal seam gas, in particular the impact of the fracking process on the water supply, very little research has been carried out into the broader effects of CSG extraction.

Measuring Fugitive Emissions: Is coal seam gas a viable bridging fuel? by the Institute's Senior Economist, Matt Grudnoff, finds that ~~Australia is likely to be significantly underestimating coal seam gas fugitive emissions by around 62 million tonnes over three years. Mr Grudnoff said gas is increasingly being seen by some as a `bridging fuel' in the fight against climate change, but because the amount of leakage at wellheads is not accurately measure, there is no way of knowing if emissions are being reduced by switching from coal to coal seam gas. The report recommends allocating funding from the $200 million the government has put aside from the Minerals Resource Rent Tax towards measuring fugitive emissions.~~

~~Another consequence of underestimating fugitive emissions from CSG is that it blunts the impact of the carbon price as firms will not be paying the tax on all of their emissions. An extra 62 million tonnes over three years is equivalent to giving CSG companies more than $1.5 billion. Mr Grudnoff said if emissions from coal seam gas are significantly lower than actual emissions, there is no incentive for CSG producers to introduce world's best practice. He says this means Australian taxpayers are effectively subsidising the industry to be inefficient. A copy of The Australia Institute's report is available from www.tai.org.au under `Publications.' *EnviroInfo, 14 August, 2012.*~~

Fracking from Lock the Gate site

Hydraulic fracturing, more commonly known as fracking or fraccing, is a technique used to stimulate and accelerate the flow of gas to a well or bore. The process involves high-pressure injection of sand, water and chemicals into the gas-bearing rock. The injection causes fractures in the rock allowing the gas to flow to the surface of the well.

The coal seam gas industry provides this list of chemicals it says are used in coal seam gas fracking operations in Australia. The National Toxics Network has raised various concerns about the environmental and health risks associated with the chemicals associated with hydraulic fracturing and has said that these chemicals are not adequately assessed or monitored.

BTEX (an acronym that stands for benzene, toluene, ethylbenzene, and xylene) is one group of chemicals associated with hydraulic fracturing. BTEX can be naturally occurring and benzene is a known carcinogen (cancer causing).The National Toxics Network says that the fracking process itself can release BTEX from the natural-gas reservoirs, which may allow them to disperse into the groundwater aquifers or to volatilise into air. Doctors for the Environment point out that a range of other hazardous chemicals are reported to be used in Australian fracking operations including 2-butoxyethanol and ethylene glycol.

Research compiled by Doctors for the Environment found that 2-butoxyethanol is easily absorbed and rapidly distributed in the human body and is particularly toxic to red blood cells, carrying the risk of haemolysis, and damage to spleen, liver and bone marrow. Ethylene glycol is used to make anti-freeze and when ethylene glycol breaks down in the body it can affect kidney function as well as the nervous system, lungs and heart.

A report by the Committee for Economic Development of Australia said: In addition to concerns over contamination of aquifers from the chemicals added to fracking fluid, issues have also been raised about contamination of water supplies from fugitive gas after fracking, and seismic activity and tremors associated with the drilling and fracking process.

A process known as ‘flowback’ is used to recover fracking fluids previously pumped underground. The National Toxics Network says that “as well as the original fluid used for fracturing, flowback may also contain other fluids, chemicals and minerals that were present in the fractured formation such as heavy metals and hydrocarbons”. Flowback does not recover all of the fracking fluid. A report prepared in 2010 for the coal seam gas industry said “It is conservatively assumed that 40% of the hydraulic fracturing fluid volume would remain in the formation and this would correspond to 7400kg of chemicals per injection well…”

Other significant concerns associated with hydraulic fracturing including the potential to contaminate water sources and cause earthquakes. A study conducted in the United States in 2011 documented “systematic evidence for methane contamination of drinking water associated with shale-gas extraction”. In the United Kingdom in 2011 the British Geological

Survey confirmed seismic events were a direct result of drilling and fracking activities by Cuadrilla Resources.

Fracking has been used during coal seam gas operations in both Queensland and NSW and there remain widespread calls for a moratorium or ban on its use. A moratorium on the use of hydraulic fracturing in NSW was recently lifted by the state government.

Extract from Submission 202 pdf

Submission prepared by:
Dr Mariann Lloyd-Smith and Joanna Immig, Coordinator, National Toxics Network, on behalf of the National Toxics Network Inc.
September 2011
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National Toxics Network Inc.
The National Toxics Network (NTN) was constituted in 1993 and has charity status. It is a community-based network of experts working on a wide range of toxic chemical pollution issues across Australia, New Zealand and the South Pacific. NTN representatives sit on various national advisory bodies and community consultative committees in relation to international chemical conventions, hazardous waste, contaminated sites, industrial, agricultural and veterinary chemical regulation.
NTN is the Australian focal point for the International Persistent Organic Pollutants Elimination Network (IPEN) and also participates in the work of the international Pesticide Action Network (PAN). NTN is a supporting member group of the Australian Environment Network (AEN), Climate Action Network Australia (CANA) and the Lock the Gate Alliance.
For further details about the National Toxics Network please visit www.ntn.org.au
Dr Mariann Lloyd-Smith
Mariann Lloyd-Smith is a Director of the research group, BioRegion Computer Mapping & Research Pty Ltd (BRCM) and the Co Chair of the International POPs Elimination Network (IPEN), a public interest chemical safety network, representing 800 organisations in over 100 countries.
Mariann gained her PhD from the Faculty of Law at the University of Technology (UTS), Sydney and has worked in the area of chemicals policy and waste management for over two decades. For ten years, Mariann was the coordinator of the National Toxics Network Inc. and now serves as one of its Senior Advisors. Mariann has published widely on chemical issues and was an author of Australia's national management plans for POPs waste.
Mariann was a member of the National Advisory Body on Scheduled Waste, used as a model of participatory democracy in chemical issues. She has been instrumental in the development and implementation of a range of information systems to support environmentally sound chemical management, including the co-development of the model for Australia's National Pollutant Inventory. Mariann is a member of the Technical Advisory Group for the national industrial chemical regulator, NICNAS - National Industrial Chemical Notification and Assessment Scheme. Trained as a negotiator in chemical disputes, she has assisted residents with their negotiations over contaminated land and has participated in the international negotiating committees (INCs) for the Stockholm, Rotterdam and Basel Conventions, the Intergovernmental Forum on Chemical Safety and the Strategic Approach to International Chemical Management (SAICM).

Mariann has presented at UNITAR capacity building and training workshops, both in Geneva and in the Pacific region. Dr Lloyd-Smith is a member of the UN Expert Group on Climate Change and Chemicals and recently coauthored NTN's report on the chemical impacts of hydraulic fracturing in the Australian shale and coal seam gas industry.
For further information contact Dr Mariann Lloyd-Smith: biomap@oztoxics.org

Overview

The National Toxics Network (NTN) welcomes the opportunity to make a submission to the Standing Committee No.5 Inquiry into Coal Seam Gas in NSW. Our expertise is specifically in the area of chemicals, pollution and community engagement so we will provide detailed information on these issues as they relate to the Terms of Reference.

The social and environmental impacts of coal seam gas (CSG) mining are significant issues of concern to communities around the world, including Australians, and specifically the communities and individuals faced with CSG developments in their regions.1

NTN representatives have spoken at public forums on coal seam gas in NSW during 2010/2011 including events in Casino, Murwillumbah, Lismore, Byron Bay and Laurieton where collectively, thousands of citizens have turned out to be better informed about the CSG industry and to voice their concerns about the possible impacts to their individual properties, communities and environment.

NTN produced a technical report (May 2011) titled Hydraulic Fracturing in Coal Seam Gas Mining:The Risks to Our Health, Communities, Environment and Climate. The report is fully referenced and freely available on our website. It is a living document and has been updated several times as new information becomes available. Some of the information provided in this submission is taken directly from the report.

The social and environmental impacts of coal seam gas mining cuts across many challenging areas including: climate change and greenhouse gas emissions; sustainable/renewable energy; chemical use; hazardous waste disposal; air, soil and water pollution; land and water use.

After careful consideration of the chemical pollution issues associated with CSG, NTN recommends that a NSW moratorium be placed on the use of all chemicals involved in the exploration and production of coal seam gas until all of the chemicals used (or proposed for use) have been fully assessed for their health and environmental

hazards and their specific cumulative risks as used in coal seam gas mining. This assessment should be conducted by the federal industrial chemicals regulator the National Industrial Chemical Notification and Assessment Scheme (NICNAS).

1 Stop Coal Seam Gas Now http://www.youtube.com/watch?v=93hRPRxXFg4&feature=related

Key findings

(NB. Not listed by order of priority but as they relate to the Terms of Reference and sequence of information in this submission)

1. The approach to risk assessment in CSG operations on a project-by-project basis does not take into account the cumulative impacts on water and air quality.

2. The disposal of salt and treatment of contaminated produce water is a significant challenge in CSG operations. Limited assessment has been made of the options for treatment and capacity of wastewater facilities and landfills to manage this hazardous waste.

3. Treatment of contaminated produce water using membrane filtration has significant limitations, as it cannot remove all contaminants, particularly organic compounds with low molecular weight.

4. There is no requirement for the assessment and monitoring of the cumulative load of chemicals used in CSG operations, or their potential to contaminate sediment, plants, aquatic species and /or animals prior to release of contaminated produce water. A chemical-by-chemical approach to risk assessment is also in contradiction with the current National Water Quality Management Strategy which recommends moving away from relying solely on chemical specific water monitoring to a more integrated approach using direct toxicity assessments (toxicity bioassays which assess overall toxicity of the water) and biological monitoring to fully assess the cumulative (additive

and synergistic) impacts of complex mixtures of chemicals.

5. NTN's scientific literature review of chemicals used by the CSG industry has found that only 2 out of the 23 most commonly used fracking chemicals in Australia (that we could ascertain) have been assessed by NICNAS, the federal regulator of industrial chemicals. Of the 2 assessed chemicals, neither has been specifically assessed for its use in CSG mining activities.

6. BTEX chemicals are commonly found in the products used in the drilling stage of hydraulic fracturing and BTEX chemicals are also components of the volatile compounds found naturally in the coal gas seams. The fracking process itself can release BTEX from the natural-gas reservoirs, which may allow them to disperse into the groundwater aquifers or to volatilise into air. People may be exposed to BTEX chemicals by drinking contaminated water, breathing contaminated air or from spills on their skin.

7. After hydraulic fracturing is completed, a mixture of hazardous chemical compounds remains underground. These chemicals are distributed over time and space making them difficult and unpredictable to manage into the future, and potentially causing impacts to landscapes and future uses of the land and water.

8. The lack of disclosure on Material Safety Data Sheets of the full chemical identity of chemical ingredients used in products for CSG mining makes it impossible to realistically assess their risks and their possible impacts to the environment and human health.

9. There is an assumption that natural gas derived from CSG can act as a transition fuel because it is a 'cleaner' fossil fuel than coal however, there appears to be limited independent data on which to base this assumption. The total greenhouse gas emissions associated with CSG need to be accounted for in a thorough life cycle analysis.

10. Air pollution associated with CSG sites including emissions from well pads, compressors, gas plants, and waste sites must undergo continuous monitoring for volatile organic compounds and hydrogen sulfide. The data should be provided to regulators and be made publically available. Facilities unable to eliminate toxic emissions should be required to cease operations. All new applications should require a full assessment of the risks and hazards to air quality.

11. CSG exploration and extraction as an industrial activity with a potentially significant impact on the environment and community should require public consultation as part of the authorisation procedure.

12. A cost/benefit analysis should be undertaken for each CSG development and include a full life cycle assessment (including greenhouse gas emission, resource consumption and cumulative impacts) to demonstrate the overall costs/benefits for the society.

Arsenic lead found in toxic coal seam gas spill

Media Release 9 February 2012

A toxic and complex cocktail of heavy metals (arsenic, lead and chromium), salts and petrochemicals has leaked from a coal seam gas water (CSG) storage into the Pilliga forest, near Narrabri in NSW.

“The NSW Government should shut down the Santos operation in the Pilliga, the last greattemperate woodland left in NSW, and implement an immediate moratorium on coal seam gas mining,” Naomi Hogan of The Wilderness Society said today.

Santos admitted in January that a spill occurred on June 22, but samples collected recently by The Wilderness Society and the Northern Inland Council for the Environment raise concerns that the spill may be ongoing and show that dangerous substances are still present at high levels in the forest.

The water tests (conducted by leading NSW laboratory and NATA accredited ALS Laboratory) detected heavy metals up to 37 times higher than natural levels and five times drinking water standards. The tests showed 0.05 milligrams per litre of lead (25 times natural levels and 5 times the acceptable level for drinking water); 0.021mg/l of arsenic (21 times natural levels and 2.1 times drinking water standards); and 0.187mg/l of chromium (37 times natural levels and 3.74 times drinking water standards).

“Our tests of the Pilliga spill have revealed for the first time just how toxic this coal seam gas water is. It is a cocktail of heavy metals, such as lead and arsenic, plus salts and petrochemicals.

“The test results also raise concerns that it is not a one-off spill and that the coal seam gas water may still be leaking into the environment, given the high concentrations of semi-volatile petrochemicals recorded" she said.

“This water represents a grave threat to human health, to wildlife, and to the precious waterways of the Murray-Darling Basin and the groundwater of the Great Artesian Basin,” Carmel Flint of the Northern Inland Council for the Environment said.

“The results show that coal seam gas mining is a risky and polluting industry that will destroy bushland and farmlands. They confirm that coal seam gas mining is not safe and that regulation by the NSW Government has failed dramatically.

“It should not be left to the community to police and monitor coal seam gas operations, and it should not be left to environment groups to fund basic water testing from donations. For more information and copies of test results contact:

Wilderness Society Media Adviser Alex Tibbitts on 0416 420 168\ For interviews contact: Naomi Hogan 0401 650 411 or Carmel Flint on 0400 521 474

Water and Salt CSG operations

Coal seams contain both water and gas. During coal seam gas operations a large amount of water must be pumped out of the coal seam to lower the pressure and allow the gas to flow to the surface.

At a Sydney meeting in August 2011, Ross Dunn from the Australian Petroleum Production and Exploration Association (APPEA) said that CSG activity "will to varying degrees impact on adjoining aquifers … the extent of impact and whether the impact can be managed is the question."

The National Water Commission has said coal seam gas development represents "a substantial risk to sustainable water management". It said that "extracting large volumes of low-quality water will impact on connected surface and groundwater systems" and noted risk factors associated with hydraulic fracturing and reinjection of treated water into other aquifers.

The water extracted during coal seam gas operations is often referred to as "produced water". This water is generally salty and can contain toxic and radioactive compounds and heavy metals.

Estimates of the total amount of water the coal seam gas industry will extract over the life of the industry vary widely. The amount of water involved in coal seam gas operations also varies, from project to project. The CSIRO says that the amount of water produced during coal seam gas operations can vary from a few thousand to hundreds of thousands of litres a day, depending on the underground water pressures and geology. In 2011, almost 16,000,000,000 litres of water was produced from 3,261 coal seam gas wells in Queensland. In NSW, 249 coal seam gas wells produced 218,000,000 litres**.**

The extraction of produced water will affect water levels in some adjoining aquifers, in some cases for many decades. Hydrological modelling conducted for Arrow Energy predicting "drawdown in the intermediate and deep groundwater systems to be greater than thresholds set by the Queensland Government". This means that farmers and other water users reliant on the adjoining aquifers will be affected.

There have been several recent incidents of contamination and pollution related to coal seam gas operations. One coal seam gas company operating in a state forest in north-west NSW admitted that 10,000L of untreated coal seam gas water had been spilled in June 2011. Testing, conducted six months later, of samples taken from near the site of the spill revealed how toxic coal seam gas water can be. The water tests detected heavy metals up to 37 times higher than natural levels and five times drinking water standards. Two coal seam gas operators werepenalised by the NSW Environmental Protection Authority for charges relating to the discharge of polluted water from coal seam gas sites. Meanwhile, in Western Sydney a coal seam gas well blow-out which sent an uncontrolled burst of foam into the air a short distance from an open drinking water channel had operator AGL put on notice by the NSW EPA.

The issue of water contamination from coal seam gas has also been raised in Queensland where locals reported gas bubbling along a 5 kilometre stretch of the Condamine River near coal seam gas operations. Dr Gavin Mudd from Monash University said that it is plausible that coal seam gas is a factor in the methane gas bubbling to the surface of the river.

Salt is another by-product of coal seam gas operations and can have a number of adverse impacts if it enters the surrounding environment. This is a particularly pertinent issue in agricultural areas where salt can permanently damage high quality soils and take them out of production. It is estimated that tens of millions of tonnes of salt will be produced as a waste product of coal seam gas operations over a 30-year period. At this stage coal seam gas companies do not know how they will dispose of this salt. Watch this Lateline Report for more information on the issue of salt disposal.