SCIENTIFIC INQUIRY INTO HYDRAULIC FRACTURING IN THE NORTHERN TERRITORY
Background and Issues Paper

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The Panel,

Thank you for accepting this submission into the Scientific Inquiry into Hydraulic Fracturing in the Northern Territory (Inquiry).

This submission relates to seeking feedback on the potential risks, or issues that the Panel has identified in the Background and Issues Paper (Paper). The Panel considered the list of the potential risks, or issues to be the following nine themes:

- Water
- Land
- Air
- Public Health
- Impacts on Aboriginal people and their culture
- Social impacts
- Economic impacts
- Land access
- Regulatory framework

I am a resident of Queensland; however, I have relevant and valuable experience in the unconventional gas industrial within the Surat Basin, that must be shared with the Northern Territory to enable a conscious decision making outcome regarding the commencement of the onshore unconventional gas industry.

I note the implicit mention that the Inquiry is only concerned with onshore unconventional deposits of shale. It was also noted that the Paper also sufficiently covered the differences between coal seam gas (CSG) and shale gas. I therefore have maintained that this submission supplies evidence that is relevant, as there are similarities between the two from of unconventional onshore gas industries that I believe the Panel would benefit from. At times references may be made to CSG or underground coal gasification (UCG), with clarification to its relevance.

Regards

Helen Bender

Understanding both sides of the equation, the benefits and the drawbacks, is the key to assessing the impact of the gas industry

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Executive Summary

in dedication to the unique natural beauty of the Northern Territory,
and in loving memory of the late George Bender

The Term of Reference (TOR) involves the Panel to "*assess the scientific evidence to determine the nature and extent of the environmental impacts and risks, including the cumulative impacts and risks, associated with hydraulic fracturing of unconventional reservoirs and the Associated Activities in the Northern Territory*".

The Paper stipulates that before any activity is approved it should be demonstrated that all the risks have been ***reduced to levels that are acceptable and as low as reasonably practicable***. I challenge this statement for the following points:

1. it is impossible for any individual to identify today what is an acceptable and reasonable environmental impact/s on behalf of our future generations – what will be the future needs?
2. what is perceived now as a low impact, may present a long term irreversible harm in the future, take for example the introduction of cane toads
3. the significant time required for certain harm to be seen and confirmed i.e. underground impacts may take decades to be witnessed at the surface by which time the damage is irreversible
4. unknown unknowns – is it reasonable to suggest that neither the government nor industry can identify all risks associated with the unconventional gas industry, as demonstrated by migrating methane in the Condamine River. If this consequence was known to be a natural occurrence, why was it not identified in an approved Environmental Impact Statement (EIS)?
    a. a former Qld EPA investigator stated, "the problem is: how do you actually verify things that are going on underground?"[1] (this statement is relevant to all unconventional processes)
5. In summary, the unconventional gas industry is dealing with nature, and there are too many unknowns to enable effective risk mitigation to an acceptable level

Furthermore, since no unanimous agreement has been reached from the decades of science or research into the process of hydraulic fracturing, indicates the significant lack of acceptance and social licence this practice has in our society. This is a fascinating phenomenon considering the length of time the industry has been operating and the volume of research into all aspects of the process. Research conclusions regarding the safety are contradictory, all the while the gas industry promotes gas extraction in the simplest of terms of just drilling into the earth. Why is this so? The answer lies in who commissions the research, even our own CSIRO-GISERA boss Dr Larry Marshall said himself, the funding stops if their research doesn't provide a "desired outcome".[2]

He who pays wins.

This constant refrain that hydraulic fracturing is a safe process, and has been used for many decades without a problem is knowingly asserted due to the real difficulties in proving without a doubt that

[1] Guilliatt, R., "*Burning Questions*", The Australian, http://www.theaustralian.com.au/life/weekend-australian-magazine/linc-energys-ucg-plant-at-chinchilla-a-smart-state-disaster/news-story/89096454ced60874c5d8e2e967fb9c1c
[2] http://www.csiro.au/Vimeo/Larry-Interview-CSIRO-changes/video-transcript

this same process has contaminated water, air and is the cause to illness. Simply stating over and over that no problems exists, does not make it so. The absence of proof of harm cannot be equated to absence of harm, and more precautions need to be taken by governments to protect people, animals and the environment and the lifestyle that comes with rural living.

A quick snapshot of the onshore unconventional gas industry: -

- Fracturing fluid is quoted as being 99.5% water and sand, and 0.5% chemical additivities, this seemingly small percentage of chemical additivities is added to approximately 20ML (5-40ML) total fluid per well, resulting in ***100,000L (25,000-200,000L) of chemical additivities injected into the environment per well***! What is the cumulative impact of these toxins into the ecosystem?
- Injecting toxic chemicals in underground restricts later use of the contaminated layer (e.g. for geothermal purposes)
- The industry would have us believe that radioactivity below ground in the Marcellus shale disappears when it is brought to the surface. Will the industry make the same claims in the Northern Territory too?
- In Australia and overseas, the common thread is that governing the oil and gas development has been inadequate to protect public health
- While offering economic and energy security benefits (if the domestic market was met), unconventional gas production presents considerable environmental risks where the cost-benefit analysis simply does not add up. This economic benefit analysis is overdue and remains as a 'still-to-be-demonstrated'
- The proponents of unconventional gas present it as a cleaner alternative to coal, reduce GHG emissions, however this has been increasingly challenged by a number of recent studies demonstrating both less clear and more limited benefits than initially claimed
- Unconventional gas mining in Australia will struggle in gaining public acceptance and given the evidence of public health and environmental concerns in just Queensland alone, proven lies, destruction of local communities, ill treatment of farmers etc., the future potential is limited, as without a social licence there will be no ability for the industry to proceed in a viable manner
- Industry and Government insist that the 'regulation' of the gas industry development best protects the public. Communities with real-life experiences of the industry know differently

The Paper has already acknowledged that hydraulic fracking ***has the potential to cause environmental impact*** and it is therefore advised that all focus and attention by the Northern Territory government must be applied to:

1. intense upfront research and investigations into understanding both the short and long term environmental and health consequences
2. independent, third party research to provide transparent and unbiased expert opinion, advice and direction to the Northern Territory government to avoid irreversible harm
3. extensive baseline studies (5-10yrs minimum) in areas that have been marked for onshore unconventional gas mining. For without adequate baseline studies, how is anyone able to identify health or environmental harm/impact? This is an implied duty of care by the government
4. Real economic analysis into if there is any benefit from this industry (beyond the gas companies)
5. More research and investment into alternative renewable energy as a matter of priority

Hydraulic fracturing may result in unavoidable environmental impacts even if shale gas could be extracted properly, and more so if done inadequately. Even if risk can be reduced theoretically, in practice many accidents from leaky or malfunctioning equipment, plus from bad practises will regularly occur because of human involvement. Humans are renowned for making mistakes, hence the reason why many engineering equations allow for a 'factor of safety', or more appropriately termed, a 'factor for human error'.

Are we prepared to learn from history? In taking a brief walk down history lane to review evidence of human error in a complex scientific arena – when even the smallest of mistakes do occur, it costs millions or billions in dollars and even human lives. Here is a reminder of what happens when science fails the best of us[3]: -

1. **The crash of NASA's Genesis probe**

   The mistake: A pair of parts were installed backwards

   Estimated cost: Over US$260 million

2. **The explosion of the Space Shuttle Challenger**

   The mistake: An "O-Ring" gasket failed in unexpectedly cold weather

   Estimated cost: US$5.5 billion

3. **The Y2K fiasco**

   The mistake: Programmers allotted just two digits to register years, failing to anticipate the turn of the century

   Estimated cost: US$308 billion

4. **The Mars Climate Orbiter is lost**

   The mistake: Some engineers used feet; others used meters (special mention: Halliburton's presentation used feet, Australia uses meters)

   Estimated cost: US$125 million

5. **Hubble's vision issue**

   The mistake: The Hubble telescope's main mirror was ground down just 2 microns too far, resulting in blurry vision (2 microns = one-fiftieth the thickness of a human hair)

   Estimated cost: US$1.5 billion for a trip to space to repair it (estimated cost of one Space Shuttle launch)

6. **Ariane 5 Rocket self-destructs**

   The mistake: An old piece of software code couldn't store an unexpectedly large integer, triggering a self-destruct

   Estimated cost: US$370-500 million

Bringing human error, a little closer to home; the Queensland Government is taking legal action against Linc Energy, an unconventional gas mining company for the largest environmental harm in

[3] http://theweek.com/articles/442447/6-tiny-scientific-mistakes-that-created-huge-disasters

Queensland's history. The same government that embraced the technology, the same government that deemed the industry as "low-risk", with no baseline testing of water and soil and no tough environmental regulations.

The mistake: Air pressure exceeded the pressure of the surrounding groundwater, fracturing the overburden. (*Replacing a few words, it is possible that the Territory's future Newspaper headline reads "Hydraulic fracturing exceeded the pressure of the surrounding overburden, contaminating groundwater"* or similar…)

The cost: Compensation costs could be immense (landholders class action against Qld Government), costs to decommission the lawful activities, and unknown costs for remediating the unlawful activities.

A lot can be said about science, however a lot more can be said about using common sense, judgement, reasonableness and morals.

The following submission supplies only a tip of the ice-berg into the scientific evidence to affect the Panel of a long-term sustainable outcome for the future is more valuable to the Territory then the short-term profits obtained by multi-national resource companies.

Water

we never know the worth of water 'til the well is dry

Are we underestimating the value of water in our world? Placing water in the direct harm of contamination, putting at risk even at low 'acceptable' risk, without baseline studies, data on the chemical composition, knowledge of the hydraulic connectivity, monitoring both industry related and naturally occurring contaminants is the definition of underestimating the value of water in the Territory.

This and the huge amounts of money involved, given this government's high integrity levels could only lead to drilling contractors taking short cuts, putting anything down the well hole without a permit or disclosure.

Value	Comment and Feedback
Water Quality	***Groundwater:*** Placing groundwater at any risk will not accepted, an acceptable level risk is a breach of the duty of care by all government. • It is not acceptable to place the groundwater at risk for any cost. It is a breach of the government's duty of care to place a natural resource at any risk, even at a low risk when all life requires 100% safe, uncontaminated and a reliable water source. The underground water is also a natural resource that is owned by the Australian people • The gas industry is unable to construct a reliable, permanent buffer between a water table and the earth using cement. To achieve this is immensely difficult, if not impossible as cement has a natural tendency to deteriorate over time creating an even greater risk for leaks as the cement shrinks, cracks or is lost to the surrounding geological structure • Steel casings can leak at the connections or corrode from acids. Evidence from underground miners must be obtained by the Panel in assessing the real risks to the shale gas wells prior to finalising their report • There is no way that the government or industry can predict the seismic events and ground movements that will place all wells at serious risk of failure • Gas wells will remain in place for many decades (there is no evidence that the industry will rehabilitate the wells after gas production is complete) • Rubin states in his report[4], "The ultimate result of extensive gas exploitation in the Muskingum River Watershed will be that groundwater and surface water contamination will occur. Such pollution is assured because: 1. the durability of well sealant materials available today to effect zonal isolation of freshwater aquifers is poor and short-lived 2. toxic hydro-fracking fluids injected deeply into the ground will move with groundwater flow systems, eventually moving upward into freshwater aquifers, reservoirs and waterways (consideration of this point must be taken into account as to the impacts for the Territory) • Within the first fifteen years following the drilling of a well, data from the US Mineral Management Service suggest that up to 50% of well casings do not adequately control the migration of hydrocarbons ("sustained casing pressure") in *offshore* wells.[5] Pennsylvania data indicate that the track record for *onshore* thus far follows the same trend as the offshore wells.[6] • For the Marcellus or Utica Shales in Pennsylvania, the shale formations are thousands of feet below the drinking-water aquifers. This fact has been used to argue in favour of the safety of the hydraulic fracking process. However, according to industry estimates, fractures can extend vertically up to two thousand feet.[7] • The industry cannot argue that their procedure is safe with science either, without the visual inspection of the entire casing their claim is based on 'assumptions' at best

[4] Rubin, Paul. "Hydrogeologic Concerns Regarding Hydraulic Fracturing: Muskingum River Watershed, Eastern Ohio." Prepared by HydroQuest for Southeastern Ohio Alliance to Save Our Water. 2012
[5] C. Brufatto et al., "From Mud to Cement: Building Gas Wells", *Oilfield Review* (Schlumberger) (Autumn 2003): 62-67
[6] A.R. Ingraffea, "Fluid Migration Mechanisms Due to Faulty Well Design and/or Construction: An Overview and Recent Experiences in the Pennsylvania Marcellus Play", Physicians Scientists & Engineers for Healthy Energy, January 2013
[7] K.Fisher and N. Warpinski, "Hydraulic Fracture Height Growth: Real Data", *Society of Petroleum Engineers Production & Operations 27 (2012): 8-19.*

Value	Comment and Feedback

	GAPS IN THE PAPER:
	• How do either the government or industry undertake visual inspections of the well construction to guarantee the well integrity?
	• Has the NT government or research based institutions investigated and completed baseline studies to determine the current chemical composition of groundwater potentially (or currently) impacted by shale gas exploration and prepared regional maps of groundwater chemistry?
	• Has the NT government or research based institutions completed thorough hydraulic connectivity between geological structures due to drilling activities? What is the existing available data, and what is the gaps in this data?
	• Claims have been made that things are safe or that it's very low risk, but often that's based on assumption, and is not based on good field data and long-term monitoring of existing gas projects (we are only led to believe that existing projects have been carried out safely)
	• What are the naturally occurring contaminants that could risk groundwater?
	• What is the change in the groundwater risk profile when refracturing occurs? The industry are able to undertake infill drilling (increasing the number of wells as the gas depletes), however now the industry can use 'microseismic' and 'refracks' to improve the productivity and profitability of old wells. Schlumberger is quoted as saying *"...execute the refracturing work that we are prepared to take significant risk in terms of how we go about doing this work."*[8]
	• What is the scientific evidence that refracturing wells will not breach the integrity of the well? How can refracturing not breach the integrity?
	
	Surface Water:
	The area surrounding Chinchilla CSG gasfields has significant evidence of environmental impact to surface waters, including rivers, creeks, dams and surface run-off.
	• The bubbles in the Condamine River will not be discussed in detail, due to this being a direct impact of CSG activities due to the dewatering/depressurisation of the aquifer and the consequence of gas migration. The only point that I would like to make is following:
	  ○ direct evidence that the industry did not undertake thorough investigations into the impacts of their activities during the EIS process. As the industry have tried unsuccessfully blame this as being a 'natural event'
	  ○ direct evidence that the industry is causing environmental harm that is outside their environmental authority, and are willing to cause environmental harm
	  ○ What confidence should any community have in an industry who are openly undertaking activities that will harm a river for many decades? This river is the head of the Murray-Darling basin system and the long-term sustainability of this river has been intentional ignored by the gas companies
	• Creeks are found with an unknown oily substance on the surface in the district. These are creeks that are in extremely close proximity to the associated facilities such as Compressor Stations, Treatment Plants – all facilities that the NT will also require
	• The photo below of the Condamine River, that receives Reverse Osmosis water from both QGC and Origin Energy treatment plants. The colour of the water (blue/green/milky) is indication of metals that have not been able to be extracted adequately from the treatment plants.
	  ○ The Executive Director for Queensland Department of Environmental Heritage Protection (EHP) admitted when presented with this photo of the river, that his immediate thoughts were aluminium or some other metal. What will be the impact to landholders who use water with high levels of metals?

[8] https://s.t.st/media/xtranscript/2015/Q2/13116913.pdf **(page 8)**

Value	Comment and Feedback
	 • Ex-gas well drillers have disclosed in confidence, since the passing of George Bender on the extent of spills that they have witnessed in the Qld gasfields (quote "*I walked around the site up to my ankles in the stuff (fracking fluids), it's everywhere through the gasfields*"), or of the company directions to spray drilling fluid on roads, the number of 'cowboys' in the drilling industry. Residents witnessed illegal dumping of contaminates in the Queensland gasfields to government authorities **DISCUSSIONS:** • What is the NT government going to implement protection across all surface waters? • How is the NT government going to monitor and regulate 'cowboy' drillers, and accidental spills, as all the 'management plans' in the world will not protect the environmental harm caused to surface water (and much more)
Water Supply & Distribution (quantity)	The main question that needs to be considered here is; has the NT government undertaken a cumulative impact assessment on the impacts to the water supply due to the shale gas mining activities to date? Do the NT government know and understand how long will it take to repair this lost water supply? • Fracking is an extremely water-intensive practice. Shale gas requires between 2,000-10,000 times more water compared with conventional gas exploitation[9] • In Ohio, it is established that injection wells were the contributing cause of a series of earthquakes occurring in the Youngstown area[10]. Seismic activity linked to injection well sites across the country as wells as fears that injection well could leak toxins that would seep into drinking water sources necessitate a more serious investigation of deep well disposal[11] **DISCUSSIONS:** • There are significant scientific information gaps on the seismic activity produced by hydraulic fracturing and injection of water into already pressurised aquifers • It is known that offshore drilling for oil/gas creates subsidence, what is the long term risk of land subsidence for the Territory? Any subsidence will redirect overland flow, change direction of surface water etc

[9] IEA, 2012, Golden rules of a golden age of gas, World Energy Outlook, Special Report on Unconventional Gas, International Energy Agency, pp.143, Paris, France, 2012

[10] Funk, John. "Waste-water injection well caused 12 earthquakes in Ohio, investigation shows." The Plain Dealer. The Plain Dealer, Northeast Ohio, n.d. Web. 28 May 2013 <http://www.cleveland.com/business/index.ssf/2012/03/shale_gas_drilling_caused_smal.html>.

[11] Lustgarten, Abrahm. "Injection Wells: The Poison Beneath Us." ProPublica. ProPublica, n.d. Web. 28 May 2013. <http://www.propublica.org/article/injection-wells-the-poison-beneath-us>

Value	Comment and Feedback
Aquatic ecosystems & biodiversity	Although water can be recycled, excessive water usage can have broad and serious negative impacts[12] on biodiversity and local ecosystems, while lowering the water table, resulting in reduced availability of water for use by local communities and agriculture. In the Chinchilla region, neither the Qld government nor industry have acknowledged environmental sensitive areas such as Groundwater Dependent Ecosystems (GDE). • The Condamine River is a major known GDE as identified in the Bureau of Meteorology GDE Atlas. This Atlas was published in 2012, but it was largely based on references pre-2010. Australia Pacific LNG and Queensland Gas Company should have undertaken an in-depth GDE investigation, especially for the mid-catchment Condamine River reaches downstream of the Chinchilla Weir…but neither company did • The bubbling in the Condamine River is well documented by both industry and government, however all reports/studies have ignored that the river is a GDE and the direct impacts on GDE's • The industry's Environmental Impact Statement (EIS) appear to be thorough, mostly due to the sheer number of pages of each EIS, however, there has not been one EIS submitted that has provided accurate information on GDEs (period) **GAPS IN THE PAPER:** • How is the NT government going to ensure that the gas companies will undertake in-depth investigations into the environmentally sensitive ecosystems, such as GEDs (or as applicable to the Territory)? It is not in the best interest of the companies to disclose such ecosystems that would hinder their approval process
Amenity Values	The amenity value is the idea that something has worth because of what it generates to those who use or view it • What is the amenity value of clean, safe, reliable water either groundwater and surface water? It is what we call LIFE and the value is invaluable • Imagine this world without the amenity of water; seeing a lake of 'water' that your ancestors in 2017 could once swim, fish and enjoy, however due to the onshore gas industry being approved by government this lake of 'water' is now just a toxic waste zone **GAPS IN THE PAPER:** • Has the NT government or research based institution considered undertaking a cost-benefit analysis of the amenity value of water (groundwater and surface) based on the potential risk that due to shale gas mining this water is contaminated and unsuitable for human/animal consumption. This would also impact the wider value of complete loss of our wildlife? • This cost-benefit analysis would also need to consider the amenity value of national parks, range-lands, recreational fishing areas and agricultural industries dependent on water
Public Health	• No Australian livestock is currently being tested for gas mining related contaminates to confirm that there has been no known breach to our food supply • The consequence of the Australian livestock industry losing their status of being 'clean and green' is of great concern. The industry is unable to insure, guarantee that there will be no contamination of livestock. There is a serious knowledge gap by the gas industry in the concerns facing the agricultural industry on the importance of protecting the long-term sustainability of our Australian Agricultural industry • Days after Jammat #4 was fractured in Queensland by QGC, a family of children suffered chemical burns from using their groundwater. This indicates that should contamination occur that there are adverse impacts to public health •
Aboriginal people & their Culture	With all due respect to the traditional owners and aboriginal people, the intimate details of their culture is outside my area of knowledge
Economic	**GAPS IN THE PAPER:** • Is it the intent that the NT government will entitle the resource industry with an unlimited, unlicensed, fee-free use of water to be used in the hydraulic fracturing process? If so, this is in direct opposition of all other water-users? Considering the water resource is owned by the people, what is the lost opportunity in revenue not received?

[12] IEA, 2012, Golden rules of a golden age of gas, World Energy Outlook, Special Report on Unconventional Gas, International Energy Agency, pp.143, Paris, France, 2012

Value	Comment and Feedback
	• The NT government must undertake a true cost-benefit analysis on the shale gas industry prior to its approval. This must include both the cost benefits and the negative impacts on the economics including be not limited to: o Changes to all industries dependent on water supply o The consequence of the Australian livestock industry losing their status of being 'clean and green'. The industry is unable to insure, guarantee that there will be no contamination of livestock. What is the loss to the Australian GDP if the cattle export industry is lost? o The cost to the Territory to replace the groundwater or surface water to enable the same quality of life prior to the shale gas industry
Cumulative Risks	Onshore gas industry has been recklessly taking our water resource without efficient monitoring into the long-term cumulative impacts: • Australian Government, National Water Commission, December 2010 stated: "*Adequate monitoring, including baseline assessment of surface and groundwater systems, should be undertaken to provide a benchmark for assessing cumulative impacts on other water users and water-dependent ecosystems.*"[13] • Seven years on in 2017, and there is still no adequate monitoring, baseline assessment of surface or groundwater systems to assess the cumulative impacts that are occurring in Queensland gasfields. • What if any baseline assessment has the Territory independently obtained. Without baseline date, the government is sending a clear message that they are not concerned about the cumulative impacts, and imposing the burden of proof onto the individual • Untreated contaminated wastewater released onto land, stated as being for the purposes of 'dust suppression' goes unmonitored in Queensland. This same activity cannot be allowed to occur in the Territory due to the contaminated waste results in ongoing liabilities for current and future generations due to: o ecological, agricultural and human health impacts associated with movement of contaminants to the water table and surface waters; o losses in land use capability and land value due to surface and groundwater contamination **GAPS IN THE PAPER:** • Has the NT government or a research based institution researched the cumulative impacts when refracturing is considered? Each refracture uses 25 percent more water, mixed with more chemical additives, than the first fracture. Each refracture generates a new load of highly contaminated wastewater. Each refracture restresses the well casings with 6000 to 8000 PSI of pressure. Each refracture increases the danger of surface contamination through accidental spills or leaks of concentrated chemicals.

[13] Australian Government (2010). Position Statement: Coal Seam Gas and Water. National Water Commission. Retrieved from http://www.nwc.gov.au/__data/assets/pdf_file/0003/9723/Coal_Seam_Gas.pdf

Land

when you take the land from the man, you take his life spirit...
– aboriginals and farmers

The element of live cannot be forgotten when it comes to the land. Many families have committed their lives to the land; from floods to drought, the land is worth more than gold to them. George Bender's connection to the land was far greater than science could measure. Consideration to the impacts on the land due to a industrialisation is required, as it would be a regret to have to update the contaminated land register with vast area of land due to onshore gas mining activities.

"a nation that destroys its soil destroys itself" - President Franklin Delano Roosevelt

Value	Comment and Feedback

Terrestrial ecosystems & biodiversity	Only the physical eyes can witness the true risks and issues imposed on the land and the ecosystems in an established gasfield. The Panel is encouraged to visit the gasfields to obtain a full appreciation of the extensive land clearing and impacts:
	• The increase in traffic volume especially trucks (specifically water trucks used for drilling), white 4WD utilities travelling on local roads 24/7, results in significant numbers of wildlife killed
	• Extensive pipeline corridors and gathering lines that have resulted in vast land clearing and hence a direct impact on all ecosystems. How is the industry able to defend this impact, and how could a government environmental department accept this direct negative impact as being acceptable? There is no alternative solution to mitigate this impact
	• Within Queensland, it is evident that the gas industry is exempt from all other Acts and Legislation that have been provided to protect land, vegetation, flora, fauna, water etc. Examples include:
	  o land clearing laws (state forests can be cleared, while a landholder is not able to clear a tree)
	  o koala habitat land can be cleared for gas wells/pipelines
	  o unlimited use to underground water, while all other users are licensed
	• Unconventional gas mining has a significant footprint on the landscape, and requires significantly more wells due to the limited area exploited per well (1km^2) and shorter life span (five to 15 years), with most of the production occurring over the first six months.[14]
	• Well pads are unable to be completely rehabilitated due to the ongoing work-overs required on each well
	
	GAPS IN THE PAPER:
	• Without thorough baseline studies, the NT government have no ability to regulate or legislate environmental laws designed to protect land, soils, air, waters, flora, fauna and allow for ecologically sustainable development. Has this baseline study being completed?
	• Will the NT government instil balanced and equal laws on the gas industry when it comes to environmental laws for all other land users?

Soil Health	• Currently the Queensland government have not implemented any monitoring or regulatory requirements to undertake soil testing in the gasfields – this is of serious concern
	• What is even of more serious concern, is that there has been no baseline data obtained prior to the gasfields commencing in an agricultural region. This has been an intentional act and is a breach of the government's duty of care
	• Untreated contaminated wastewater released onto land, stated as being for the purposes of 'dust suppression', is unmonitored in Queensland. Contaminated waste results in ongoing liabilities for current and future generations due to:
	  o ongoing cost of waste storage, waste management, monitoring and land remediation (huge area of land is required);
	  o ecological, agricultural and human health impacts associated with movement of contaminants to the soils, water table and surface waters;
	  o losses in land use capability and land value due to surface and groundwater contamination, increased land salinity, soil contamination and erosion

[14] IEA, 2012, Golden rules of a golden age of gas, World Energy Outlook, Special Report on Unconventional Gas, International Energy Agency, pp.143, Paris, France, 2012

	• Drilling waste and wastewater contain radioactive compounds, mostly in the form of radium-226 and radium-228.[15] While both are hazardous substances, radium-226 is of particular concern, because it can remain in the environment for thousands of years (its half-life is approximately 1,600 years) **Richard Cottee's (Managing Director for QGC) Letter to EPA on 9 May 2005 – Amendment of Application for a Pipeline Licence PPLA107 and Andrew Robson's (Regulatory Manager for QGC) Letter to Bender's on 16 May 2005** (hard-copy available upon request) • QGC claimed that the water removed from the gas at the Compressor Stations is not saline and can be used for irrigation or stock watering o Cottee lied to Qld Government department about the water quality o Robson lied to the landholders about the water quality of the condensate removed from the gas at the compressor stations • Landholder Services letter to EHP dated 2 August 2005 confirmed the above lies by QGC, see Appendix A: o Test reports on water sampled had extraordinarily high corrected adsorption ratio of around 625, the associated water will destroy the structure of any soil – permanently if the exposure is frequent or prolonged o The fluoride content of about 4mg/L exceeds the guideline level of 2mg/L and with bicarbonate alkalinity about 600mg/L the water is unsuitable for, and poses some risks for stock. o The relevant QGC's EIA and EMP state that the quantities and quality of the water is unknown, and that this water will be disposed of to landholders including a major feedlot (without clarifying whether the water is treated or not) **DISCUSSIONS:** • The restoration of well sites after exploitation needs to be consider soil salinity and acidity. Often restoration fails due to toxicity problems.[16] • Impacts on overland flow paths have been evident in Queensland due to the hundreds of kilometres of pipeline and infrastructure that is required. Interfering with overland flow has unlimited adverse consequences on the how the land is able to produce food/fibre for other land users.
Aboriginal people and their culture	With all due respect to the traditional owners and aboriginal people, the intimate details of their culture are outside my area of knowledge
Economic	• The value of land loss is not just for the life of the industry, but for at least another 50+yrs (min) after the industry ceases • Soil will require a minimum of 50yrs to return to its pre-industry productive capacity, and at best will only achieve 90% of its productivity • The loss of land and productivity will have a direct negative impact on the livestock capacity the land will be able to support/carry **GAPS IN THE PAPER:** • NT government must undertake a cost-benefit analysis to consider the economic value of their land, including the value of their fauna and flora (possible risk of extinction), national parks, rangelands, fisheries, tourism and agricultural industries dependent on land use.
Amenity Values	The amenity value is the idea that something has worth because of what it generates to those who use or view it. • What is the amenity value of healthy land that offers pristine ecosystems and biodiversity in the Northern Territory? **Evidence of Pipeline Subsidence** • Physical evidence of pipeline subsidence is evident right across the gasfields, I urge The Panel to visit the gasfields to witness the poor workmanship that the gas industry promises is World Class and highly regulated. Two examples provided below; o *Origin Energy Pipeline* – this is second time this pipeline subsided, Origin have attempted to rectify this again. However, to rectify this first subsidence required the involvement of the Qld Government, CSG Compliance Unit, Environmental, Heritage and Protection (EHP), as

[15] EPA, "Radioactive Wastes from Oil and Gas Drilling", https://nepis.epa.gov (viewed 25 April 2017)
[16] Cook, J., and Johnson, M., 2002, Ecological restoration of land with particular reference to mining metals and industrial minerals: A review of theory and practice, Environ. Rev., 10, 41-47

	this pipeline was also constructed in a manner that disrupted the overland flow paths through prime agricultural land. https://www.facebook.com/GeorgeBender68/videos/1241848602598133/ o *QGC Pipeline* https://www.facebook.com/GeorgeBender68/videos/1013439705439025/ **GAPS IN THE PAPER:** • Has the NT government or research based institution considered undertaking a cost-benefit analysis on the amenity value of their land based on the potential risk that due to shale gas mining this land and all that depend on it, is contaminated and unsuitable for human/animal use. How would this impact on the sensitive ecosystems? • This cost-benefit analysis would also need to consider the amenity value of national parks, rangelands, recreational fishing areas and agricultural industries dependent on land use
Cumulative Risks	• The primary concern is that the gas industry has no set footprint, unlike a coal mine or the like. Therefore, the cumulative risks are difficult and near impossible to ascertain and quantify when the footprint is unknown • It is understood that consideration to proceed with shale gas mining will be determined based on the economic gain to the Territory and therefore I express my deepest apprehension that the seriousness of the economic loss will be overlooked based on, 'it is too difficult to quantify'

Air

"if your drinking water is contaminated with chemicals, you might be able to make do with another source. But if your air is toxic, you can't choose to breathe somewhere else…" Deb Thomas, ShaleTest

We have a climate that lends itself to solar and wind clean energy generation, yet we stubbornly continue along the fossil fuel path of coal and gas.

Value	Comment and Feedback
Public Health	• Unconventional gas is essentially methane with other contaminants, such as Volatile Organic Compounds (VOCs) and Polycyclic Aromatic Hydrocarbons (PAHs) • VOCs are oil and gas by-products which are associated with a range of different immediate and long-term health problems, including damage to the liver, kidneys and central nervous system with some VOCs considered to be carcinogens o BTEX (Benzene, Toluene, Ethylbenzene and Xylene) chemicals which are present in the mixture of hydrocarbon liquids in raw natural gas produced from many natural gas fields, known as condensate[17] o The VOCs emitted will depend on variables such as the specific type of extraction or production activity; stage of production; what specific companies are involved and what chemical "recipe" they use; differences in geologic conditions at different sites (i.e. what chemical mixtures are used according to the type of underground shale formations in which gas are contained)[18] o VOCs are associated with a range of different immediate and long-term problems, including eye, nose and throat irritation, headaches, lower cognitive function, loss of coordination and nausea, damage to liver, kidney and central nervous system, and some VOCs are considered to be carcinogens. These health problems have been well documented in all areas where gas mining is being undertaken – NSW, Qld, United States, Canada etc o Peer-reviewed research indicates a link between exposure to oil and gas chemicals and negative health effects on people who live and work close to oil and gas developments sites[19],[20] o Some BTEX and VOCs may have endocrine disrupting (hormone scrambling) properties as well. Even very low levels of endocrine disrupting chemicals (EDCs) are known to contribute to a range of health effects, in particular reproductive and developmental problems, at levels below existing safety limits.[21] o Little information exists about how VOCs in mixtures interact with each other and in the human body, but scientific research indicates that VOCs might interact in ways that ratchet up the risk of harm to humans. [22] In addition, VOCs in combination with other environmental factors may result in increased risk. For example, VOCs may increase the toxicity of particulate matter in the air (e.g. soot) which is emitted by the gas development activities.

[17] Natural-gas condensate is a low-density mixture of hydrocarbon liquids that are present as gaseous components in raw natural gas. Some gas species within the raw natural gas will condensate to a liquid state if the temperature is reduced to below the hydrocarbon dew point temperature as a set pressure. For further information see: CONCAWE, Environmental science for the refining industry: http://www.concawe.eu/uploads/files/Additives_in_imported_Natural_Gas_Condensates-2008-04062-01-E.pdf. Impurities such as BTEX chemicals are present in the condensate portion of natural gas; it is not refined out and remains in the natural gas distributed to gas fired facilities and for home use. BTEX chemicals are also contained in oil condensate and continue to be present in crude oil refined materials.

[18] http://www.endrocrinedisruption.org/chemicals-in-natural-gas-operations/introduction and https://www.fracfocusdata.org

[19] Concern Health Professionals of New York (2014). Compendium of Scientific, Medical, and Media Findings Demonstrating Risks and Harms of Fracking (Unconventional Gas and Oil Extraction), July 10, 2014. http://concernedhealthny.org/compendium

[20] Hays, J, Shonkoff, S B C (2016)., Toward an Understanding of the Environmental and Public Health Impacts of Unconventional Natural Gas Development: A Categorical Assessment of the Peer-Reviewed Scientific Literature, 2009-2015, April 20 2016., http://journals.plos.org/plosone/article?id=10.1371/journal.pone.0154164. This paper demonstrates that the weight of the findings in the scientific literature indicates hazards and elevated risks to human health as well as possible adverse health outcomes associated with UNGD

[21] "Endocrine disruption is the insidious trespass of man-made chemicals into every vital organ system in your body that comprises or is controlled by the endocrine system, such as the thyroid, parathyroid, pancreas, adrenals, thymus, male and female reproductive organs, the heart, digestive system, and skeletal systems – all the systems that participated in how you were constructed in the womb and how you are functioning today" http://www.psr.org/environment-and-health/environmental-health-policy-institute/responses/endocrine-disruption-public-health-and-national-and-international-security.html

[22] Batterman, et al (2014), op.cit., Brown D, Weinberger B, Lewis C, Bonaparte H. (2014). Understanding exposure from natural gas drilling puts current air standards to the test; Rev Environ Health. 2014;29(4):277 92. doi: 10.1515/reveh-2014-0002.

	Studies show that some VOCs may also combine with nitrogen oxide in the presence of sunlight to create new chemical compounds considered to be harmful of human health.[23] o With approximately 1,000 chemicals used in and produced by gas operations, there is a critical need for methods to assess the EDC activity of these complex mixtures o The study paper by Coming Clean, *When the Wind Blows*, is the first study into how VOC exposure pathways could be traced from the point of emission, to the air inhaled by a participant, and then to chemical breakdown products (metabolites) measured in urine when these chemicals were excreted. [24] • No safety levels have been established for the majority of chemicals associated with gas production – which can number in the hundreds • Fugitive emissions are unregulated and go unmonitored by the industry and the government. Fugitive emissions are unable to be seen by the naked eye. • High Point Vents (HPV) are not included in the current emission data provided by the gas industry • Flaring of propane-rich gas produced measurable amounts of soot emissions and many PAHs attached to soot particles, including naphthalene, acenaphthalene, fluorene, phenanthrene, fluoranthene and pyrene. • Highly toxic chemicals were present at many sites and levels of some chemicals in the Wyoming air were up to 7,000 times the health based exposure standards set by the US EPA and the Agency for Toxic Substances and Disease Registry (ATSDR)[25] • An Alberta Research Council study found more than 150 VOC and PAH species in the plumes of flares (gas associated with the oil fields in Alberta). The most abundant compounds detected in flare emissions were benzene, styrene, ethyl benzene, toluene, xylenes, acenaphthalene, biphenyl and fluorene • The environmental issues of gas flaring are generally described in terms of efficiency and emissions[26] o The ***flare efficiency*** is a measure of the effectiveness of the combustion process in fully oxidizing the fuel ▪ When inefficiencies occur, unburned fuel, carbon monoxide, and other products of incomplete combustion (e.g., soot, volatile organic compounds, etc.) are emitted into the atmosphere ▪ Gas well flares that demonstrate black soot and 'break-away' from the main flare indicate that there is incomplete combustion, and other hydrocarbons, VOCs and PAHs. It is now time that the public are provided with detailed analysis of what is taking place with the gas industry flares and venting. As we all know what pure methane looks like when burnt, and it is nothing like we witness in the gasfields o The ***emissions*** of the products of incomplete combustion can also raise health concerns for animals and people ▪ If the flare stream contains methane, the unburned fuel represents an increase in greenhouse gas emissions ▪ In the case of sour gas flares, any unburned fuel emissions are potentially toxic

[23] Doyle, M, Sexton, K G, Jeffries, H, Bridge, K, Jaspers, I (2004). Effects of 1,3-Butadiene, Isoprene, and their Photochemical Degradation Products on Human Lung Cells. Environmental Health Perspectives. 2004;112(15):1488-1495. doi:10.1289/ehp.7022.

[24] Crowe, E., Patton, S., Thomas, D., Torpe, B., "*When the wind blows: Tracking toxic chemicals in gas fields and impacted communities*", Coming Clean Inc, June 2016, pp15 http://comingcleaninc.org

[25] Pollutant levels were compared to exposure standards set by the federal Agency for Toxic Substances and Disease Registry (ATSDR), for health effects other than cancer, and the EPA's Integrated Risk Information System (IRIS) for cancer.

[26] "Reckless Endangerment while fracking the Eagle Ford", https://www.earthworksaction.org/files/publications/SUMMARY-RecklessEndangerment.pdf

	 **DISCUSSIONS:** • Do the NT government know accurately the concentrations of all other contaminants, to determine the risk to the air quality? If not, how will the NT government independently determine what these contaminants are to ensure the safety of community and the people/animals? • Will the government engage 3rd party, independent bodies to implement state-of-the-art methods including but not limited to real-time monitoring with chemical ionization mass spectrometry, drone-mounted mini-lasers and gas cells, tomographic remote sensing, inverse modelling of emissions, 3D fluid, chemical, and transport models, and contemporary control technologies, such as flare minimization, oxidation catalysts, and vapor recovery? • In addition, field studies, policy-relevant modelling assessments, and regulatory decisions as mandatory across all aspects of the industry? • Annual testing of the air and residents' bodies for chemicals known to be linked to the gas industry using biomonitoring (biomonitoring is the identification of levels of chemical substances or their breakdown products (metabolites) in body tissues of fluids
Climate Change	Whether gas mining will induce a decrease or an increase in Greenhouse Gas (GHG) emissions is contingent to several conditions: **Short or Long-term view** • It is critical to assess the 20-year horizon due to the requirement to reduce GHG emissions in the coming decades. • Methane (CH_4) is a more potent GHG than CO_2 • CH_4 when released in the atmosphere (venting), its Global Warming Potential (GWP) is up to 72 times higher than CO_2 over a 20-year period, and 25 times higher over a 100-year period • Venting (and other leakages) can significantly reduce the life-cycle benefit of gas compared to coal or petroleum **Gas Flaring and Venting – A worldwide problem** • Raw 'natural' gas is commonly a mixture of methane and other hydrocarbons – mainly ethane, propane, butanes and pentanes. Associated gas also contains water vapour, hydrogen sulfide (H_2S), carbon dioxide (CO_2), helium, nitrogen and other minor compounds o Direct venting of gas releases a significant amount of methane into the atmosphere, along with H_2S and volatile organic compounds (VOC) – the amount can vary significantly from site-to-site o Flaring of gas on the other hand, mainly emits carbon dioxide (CO_2) and carbon monoxide (CO) along with a variety of air pollutants, such as VOCs (which include carcinogens and air toxins), nitrogen oxides (NO_x), sulfur dioxide (SO_2), toxic heavy metals and **black carbon soot**. The flaring process is often inefficient, resulting in a mix of constituents that range between vented natural gas and the ideal emissions from burning the gas. • Methane is a potent greenhouse gas and a contributor to climate change

	• Emissions of potentially toxic air pollutants are highly dependent on the combustion efficiency of the flaring system **DISCUSSIONS:** • The data on flaring and venting volumes are highly speculative. The uncertainties in the magnitude of gas flaring and venting needs to be resolved in order to understand the nature of the problem and the impacts (both economically and environmentally) • How will the NT government monitor the flaring and venting of gas to acceptable levels? It is one thing to regulate the amount of venting and flaring, however it is another thing for the government to monitor this activity. In Queensland it is self-monitored and regulated and this is inadequate to protect both public health and climate change • Will the NT government undertake independent research into the chemical composition of the gas (specifically the hydrocarbons)? Without this information, there is no means to mitigate to acceptable levels this activity
Amenity Values	• "amenity value", includes any quality or condition that conduces to its enjoyment. What is the level of enjoyment if you cannot breathe the air around you?
Cumulative Risks	• Untreated contaminated wastewater released onto land, stated as being for the purposes of 'dust suppression', is unmonitored in Queensland. Contaminated waste results in ongoing liabilities for current and future generations due to: o human health impacts resulting from *air-borne contaminant exposure* **DISCUSSIONS:** *Animal Health* • The effects of drilling and flaring have been reported in environmental health studies.[27] • Stillborns and other reproductive problems in cattle have been documented in these scientific literature reports in areas of gas mining overseas. Reports of mothers who miscarriage and have had difficulties in falling pregnant have also surfaced in the Queensland gasfields. • Direct witnessing of significant health impacts to pigs in the Queensland gasfields from unconventional gas mining is available. The piggery operation has been on the property since 1940, and this health impact was first witnessed in 2010 – at the same time the unconventional gas industry increased production in the surrounding district. • Refer to Appendix B for photo evidence of the health impacts on pigs on the nights/days that the gasfields were flaring/venting o Photo 1: of a young weaner pig was taken on 24th January 2016, indicating that the health impacts on the livestock are still continuing even AFTER (emphasis added) the Linc Energy UCG site commenced decommissioning of their plant, however gas flaring ongoing o Photo 2: of a grower pig was taken on 16th February 2016, showing environmental impacts on the eyes of animals due to poor air quality o Therefore, the continuing health impacts that are being witnessed indicates that there are still environmental stresses on rearing pigs in the Hopeland district o On the night of 11th December 2015 there were significant flaring/venting occurring in the gasfields. The following morning three (3) sick pigs were found with all animals dying within 3 days of the flaring. o The poor air quality due to unconventional gas mining is responsible for the health of animal rearing o I encourage the Panel to visit Queensland and review more photo/video evidence • QGC undertook extensive gas flaring during a week in May 2016. Evidence of pigs becoming sick, difficulties in breathing were witness. On the third day of flaring, pigs had neurological issues and appeared to have had seizure and unable to maintain balance. A short video was produced, and can be viewed here: https://www.facebook.com/GeorgeBender68/videos/1105454429570885/

[27] C.L. Waldner, C.S. ribble, E.D. Janzen, and J.R. Campbell, "Associations Between Oil- and Gas-Well Sites, Processing Facilities, Flaring, and Beef Cattle Reproduction and Calf Mortality in Western Canada, "*Preventive Veterinary Medicine* 50 (K=July 19, 2001): 1-17; C.L. Waldner, "The Association Between Exposure to the Oil and Gas Industry and Beef Calf Mortality in Western Canada", *Archives of Occupational and Environmental Health* 63 (2008): 220-40; C.L. Waldner and E.G Clark, "Association Between Exposure to Emissions From Oil and Gas Industry and Pathology of the Immune, Nervous, and Respiratory Systems, and Skeletal and Cardiac Muscle in Beef Calves", *Archives of Occupational and Environmental Health* 64 (2009): 6-26; D.G. Bechtel, C.L. Waldner, and M.Wicktrom, "Associations Between In Utero Exposure to Airborne Emissions from Oil and Gas Production and Processing Facilities and Immune System Outcomes in Neonatal Beef Calves", *Archives of Occupational and Environmental Health* 64 (2009): 59-71; D.G. Bechtel, C.L. Waldner, and M. Wicktrom, "Associations Between Immune Function in Yearling Beef Cattle and Airborne Emissions of Sulfur Dioxide, Hydrogen Sulfide, and VOCs from Oil and Natural Gas Facilities", *Archives of Occupational and Environmental Health* 64 (2009): 73-86

	• There is a consistency of symptoms across all areas where unconventional gas extraction occurs (Australia and overseas), we can see that the symptoms start when the drilling commences, we can see that the symptoms go away when people or animals leave the area…but this is not considered scientific proof; there is no denying that there is a direct correlation. • Health impacts of benzene and toluene: they can affect the nervous system at even low levels, making a person (pig) appear drunk and extremely tired • In lieu of definitive answers, some producers are rejecting milk from dairies engaged in land farming because of the high cost of testing for contaminants (Fonterra).[28] The Australia Public may demand that all produce that comes from gasfields must be tested and verified to be safe to eat. Once one contaminated animal is found, this will impact the entire food producing areas with gasfields.

[28] Radio New Zealand News, "Fonterra to Stop Taking Milk from Farms with Oil and Gas Waste", June 19 2013, http://www.radionz.co.nz/news/rural/138025/fonterra-to-stop-taking-milk-from-farms-with-oil-and-gas-waste

Public Health

Public health is all around us: the water we drink, the peace in our minds, and the environment in which we live in…

I have assessed the comment from the Paper, "*The Panel is of the view that such risks [health and safety risks to workers] are different to public health risks and are outside the scope of this Inquiry*", to NOT exclude the residents who reside 24/7 inside the gasfields for the entire time of the industry development and are therefore exposed to higher and on-going levels of health and safety risks in comparison to a worker who are only exposed during intermitted shift work periods.

The shale gas development (if approved to commence) will rapidly expand and the health impacts have not been adequately researched anywhere in the world. The lack of information on the chemicals and mixture of chemicals used and the wastes produced, means there is insufficient data on the short and long-term cumulative impacts. There is insufficient evidence to ensure the safety of either workers or residents, that would lend itself that effective regulations are required under the precautionary principle. Given the possibility of serious and irreversible harm to health, the outcome of this Inquiry will determine the value that is placed on a live within the Northern Territory.

Value	Comment and Feedback
Drilling and fracking chemicals	• To date, the gas companies have not openly disclosed the extensive and concerning list of chemicals used in the fracturing process. It is documented to be over 200 chemicals including diesel, rust inhibitors, proppants and antibacterial agents • In 2013, Clean Production Action analysed chemicals used in hydraulic fracking in the U.S.[29] An initial screening assessment of 1,100 chemicals and full GreenScreen assessments of 43 chemicals injected into fracking wells reveal that: 1. Two-thirds of chemicals in wide-spread use in hydraulic fracking have little or no information available on how hazardous they might be 2. Industry disclosure mechanisms are inadequate, while widespread use of 'trade secret' mechanisms thwart public oversight 3. The industry is using more chemicals than previously listed on government databases 4. Over 200 of those chemicals assessed were identified as substances of high hazard to both human health and the environment • If companies are not required to publicly disclose the full list of chemicals used (due to being trade secrets), assessing the potential short and long-term impacts on public health will be difficult and high risk o Reviewed the Qld government QDEX and was unable to find with ease the fracking data of wells, why? Is this intentional? • Detailed development plans are required by the gas industry across the entire area prior to approval of the industry. Without this information, it is impossible to determine the real impact i.e. where will all the treatment plants be located, and across what distances will fracking waste be trucked, or will the industry use the environment as a dumping area in remote and isolated areas? • Fracking waste has two components, fluid and solid wastes: o Fluid – the volume of waste fluid is astonishing given that a single well will need to be fracked multiple times. Flowback water is recovered from each well, which includes drilling fluid with added liquids and chemicals and any produced formation brines from the drilled well. This flowback water can have the potential to contain radioactive concentrations. The flowback water is often sent for injection well disposal or to waste water treatment facilities to be processed for eventual release back into the environment o Solid – how much solid waste will be produced? Estimating that the average diameter of the well is 0.3m and that the horizontal length as per the Paper (1,500 – 4000 m). This results in approximately 424 – 1,131 m^3 per well of radioactively contaminated shale rock that needs to be disposed of- somewhere. Based on 10,000 wells, will yield between ***4.24 – 11.31 million cubic meters*** of waste that will need to be relocated to a new home and managed and monitored for ***generations*** not just for the short-term duration of the industry. Where will this waste be disposed of, do the industry have any viable answers, or as the industry

[29] Penttila, B., Heine, L., Craft, E., (2013). Submission: EPA Notice. Agency Information Collection Activities, Proposals, Submissions, and Approvals: Inform Hydraulic Fracturing Research Related to Drinking Water Resources. https://www.regulations.gov/#!documentDetail;D=EPA-HQ-ORD-2010-0674-1770.

did in Queensland, sold the lie that the waste was valuable and now they promote an "encapsulation program" (industry term used by Arrow Energy), which simply means LANDFILL. Will it be municipal landfill or industry owned, will it be on a private landholder land, or industry owned land?
    - Unfortunately, "there are business pressures" on companies to "cut corners", said John Hanger, who stepped down as secretary of the Pennsylvania Department of Environmental Protection in January of 2011. "It's cheaper to dump wastewater than to treat it," he added[30]
- The structural integrity of gas wells is in question. The ability of these wells to age successfully is unknown; the concern is that toxic contaminants will gain access to aquifers and reservoirs over time. The structural integrity of the wells at locations that cut through aquifers is in question, not only after aging, but from the initial construction.
- If drilling companies are not required to publicly disclose the full list of chemicals used, assessing potential short- and long-term impacts on public health will be difficult, if not impossible.
- Colborn and others[31] compiled a list of products (about 1000) used in fracking fluid. They carried out literature review on 353 chemicals and found that "*more than 75% of the chemicals could affect the skin, eyes, and other respiratory and gastrointestinal systems. Approximately 40-50% could affect the brain/nervous system, immune and cardiovascular systems, and the kidneys; 37% could affect the endocrine system; and 25% could cause cancer and mutations*."
- Nonylphenol, for example, which is commonly used in fracking fluid, mimics estrogen, and can cause the feminisation of fish, even at concentrations not detected by normal monitoring of the fluid[32]
- Bactericides are used in hydraulic fracturing fluid to kill bacteria and avoid bacterial films that would impede the flow of gas to the surface. Making fracturing chemicals more "green" might have the unintended consequences of bringing viable, uncharacterised microbes to the surface. Contamination by microbes is an area that is almost entirely unknown in this field. We know that even at the elevated pressures and extremely salt concentrations of the shale layers, bacteria and archaea (single-cell microorganisms with no nucleus or other membrane-bound organelles) are present and may be quite different from the organisms found at the surface.[33]

HALLIBURTON HEARING STATEMENT (10 MARCH 2017 TO THE PANEL)

- Presentation used imperial measurements – impractical for Australian use (note: the reason for the lost Mars Climate Orbiter??)
- Benefits presented was for the United States – irrelevant to Australian Market, and similar data for Australia is having the opposite affect
- Stated the biocides have been 'replaced' with other technologies – see their own presentation that clearly included biocides as a component in the fracturing fluid (2nd largest component of the fluid system)
- Dry blend is to reduce the occurrence of spills, due to mixing smaller volumes of chemicals onsite. This requires further interrogation due to:
    - The same volume of fracturing fluid is required per well, hence there would be an increase the number of mixes and hence increase the number of possible chances of on-site spills
    - The cumulative risk would increase with the increased number of on-site mixes
- Halliburton made the following statements about disclosure of chemicals and FracFocus:
    - Fully support the disclose of chemicals
    - the database is independently managed
    - the list of chemical information is available to the public
- However, the reality of Halliburton as a legitimate agent to present to the Panel is dubious:
    - They essentially request for proprietary fracturing chemical blends to be provided with regulatory silence (not fully disclosed). How can the risks be assessed if the amount of chemical is unknown? It is well known that many toxic substances can affect multiple physiological processes and at different concentrations. In some cases, for example, certain endocrine disruptors, low concentrations can even be more toxic than higher

[30] Urbina , Ian. "Regulation Lax as Gas Wells' Tainted Water Hits Rivers." The New York Times. 26-02-2011. Web. 23 Apr 2013. http://www.nytimes.com/2011/02/27/us/27gas.html?pagewanted=all&_r=0

[31] Colborn, T., Kwiatowshi, C., Schultz, K. and Bachran, M. (2011), Natural Gas Operations from a Public Health Perspective Human and Ecological Risk Assessment: An International Journal, 17(5), 1039-1056

[32] NYS-WRI (2011), New York State Water Resources Institue Waste Management of Cuttings, Drilling Fluids, Hydrofrack Water and Produced Water, http://wri.eas.cornell.edu/gas_wells_waste.html (accessed 15 April 2017)

[33] Zhang, G., Dong, H., Xu, Z., Zhao, D., Zhang, C., "Microbial Diversity in Ultra-High Pressure Rocks and Fluids from the Chinese Continental Scientific Drilling Project in China", *Applied and Environmental Microbiology* 71 (2001): 3213-27

concentrations. We know almost nothing about the health effects of mixtures of toxic substances.[34] This is ringing of the 'Halliburton Loophole' from the States!
    - Halliburton's hesitation on agreeing with full disclosure of all chemicals to Regulatory body when asked by the Panel
    - Halliburton provided an inadequate response to the question asked about the execution of fracking and 'who checks them'. How can this company not know who they are reporting to?
    - The Product Water chemical composition is unknown by Halliburton. Therefore, how can this company claim that the fracturing fluid is safe, if there is no knowledge of the product water which is returned
    - FracFocus: Halliburton only provide the 'General Composition Name' (or the Generic Compound Name), however the composition information is not provided (this is the exact recipe of chemicals inside each proprietary item). The individual chemical is provided; however the quantity or which chemical goes into which proprietary composition. Without knowing the amount of chemical being used, how can the Panel determine the level of risk imposed by fracturing?
- Research into FracFocus indicates the following mistruths told:
    - FracFocus is a government and industry-funded website
    - FracFocus has never lived up to its promise of bringing true transparency to fracking. At least one state is planning to set its own course for fracking disclosure. Pennsylvania's Department of Environmental Protection has announced that it is withdrawing from FracFocus.
    - there is a lack of user-friendliness, which has long been a source of consternation to researchers attempting to document the impacts and risks of fracking
    - AFTER a well is drilled, an interested party can visit the FracFocus website to obtain a partial list of the chemicals used in the drilling process.[35] As a landholder, should you have the right to know prior to drilling a full list of chemicals that will be used on your property?
    - Only chemicals that are not proprietary are reported, and any reporting is at the discretion of the drilling company.
    - FracFocus does not provide the tools needed to design a comprehensive predrilling test
    - data is not presented clearly. Rather than a company simply listing how many gallons of water and how many pounds of which chemicals it pumped deep underground at which well, key numbers are presented as percentages of the final fracking fluid. That requires a significant series of careful database queries and spreadsheet calculations to get actual usable figures
- Halliburton weren't able to clearly explain how a multi-well pad is constructed, therefore, how have Halliburton been able to assess the risks from fracturing and what limitations are imposed on a multi-well pad if they don't understand how a multi-well is constructed?

DISCUSSIONS:

- Will the NT government undertake the following activities?
    - obtain a full list of chemicals used in the fracking process
    - able to adequately monitor the use of these chemicals at each drill
    - complete extensive research into the list of chemicals and the health impacts associated (short and long term) with each chemical in an acute and cumulative exposure
- Will the NT government allow (as in regulate) landspraying of radioactive brine from "horizontal drilling", therefore potentially ending up in water sources or being resuspended in the air. There is no method to proving or certifying where the brine has actually come from, therefore making it nearly impossible to detect violations from spreading radioactive brine from horizontal wells
- How will the NT government monitor all truck movements 24/7 to ensure that there is no illegal dumping of waste material?
- How are underground wells routinely inspected for their integrity? At construction and every 5yr interval (say)?
- During the cement bond logs – will there be a regulatory inspector on site to confirm that the works are 100% prior to the fracturing procedure? This cement bond is the one and only layer in protecting the long-term sustainability of the environment and future. What report/record is provided for each well? Is it possible to skip this process by the drillers – i.e. is it just a 'tick-and-flick' procedure?

[34] Bamberger, M., Oswald, R., 2014, "*The Real cost of Fracking: How American's shale gas Boom is Threatening Our Families, Pets and Food*", Beacon Press Books, pg27
[35] ibid

	• The entire drilling process requires a clear understanding of the roles and responsibilities of each company, to determine the liable party when anything goes wrong as the industry has no clear understanding of the chain of legal responsibility • The Panel did not ask what percentage of the fracturing fluid is not returned and remains in the ecosystem? What is the cumulative impact of this unreturned fluid in the environment in the long term?
Hydrocarbons and BTEX	• In Texas (US), residents near shale wells revealed to have blood and urine results with toluene present in 65% of those tested, and xylene present in 53%[36] • There is currently incapacity to address the toxicity of mixtures. Research by Dr David Brown of the South-west Pennsylvania Environmental Health Project has documented that emissions vary at each well pad due to several factors, including the type of gas being extracted, the mixture of fluids used, the quality of equipment as well as the methods of extraction and processing. He states, "Reference standards are set in a form that inaccurately determines health risk because they do not fully consider the potential synergistic combinations of toxic air emissions."[37] **DISCUSSIONS:** • NT Government must establish how it will establish a risk based assessment when the current state of science is unable to estimate the potential risks due to exposure from multiple chemicals at the same time, which may be higher than the concentrations of various compounds are comparatively low and are not likely to raise significant health issues of concern
Radioactive substances	• Radioactivity of the NT shale basins must be known prior to extensive gas drilling can commence • Fracking not only brings this highly radioactive material to the Earth's surface, but exists in the solid and liquid waste that is created as a result of the process o Radioactivity in oil and gas wastewaters has been found to exceed the U.S. Environmental Protection Agency's drinking water limits by up to 3,600 times, exceeding federal industrial discharge limits set by the Nuclear Regulatory Agency by more than 300 times[38] • Radium is highly soluble in water, hence rain water percolating throughout the landfill will allow the radioactive constituents of the material to leach out into the environment and potentially into aquifers or surface water • Radium can become airborne and be inhaled if any radioactive waste is illegally disposed of, especially during the drier months **DISCUSSIONS:** • Independent testing of the NT shale basins to be completed prior to approving the industry. The industry can not undertake this testing as there is a clear conflict of interest • Who will be responsible for the ongoing monitoring, the constant containment and dealing with landfill leaks and other breaches after the industry have turned off their last well and abandon the area? We know it won't be handled by the industry, and even if regulated the applicable company will transfer that portion of the 'business' to a new company which will declare bankruptcy. This will become a generational issue left to the people of NT • Sampling and testing of materials to be sent to landfills would yield best results if conducted by a third disinterested party or the officials at the receiving landfill, who may be held liable for any radioactive materials present within the facility. The regulatory agency must be able to review the sampling program. However, the gap still present is that the company will illegally dispose of material in a remote and isolated region if the material is above regulated radioactive levels • Extensive field research is required prior to approval to understand the potential risks and determine if these risks can be mitigated at all • Who will conduct specific background tests for total alpha, total beta, total uranium and total thorium (or as specific to NT shale)? Gamma spec testing should identify specific radionuclides in the uranium decay chain, such as bismuth-214 and lead-214, and actinium-228 and thallium-208 and specifically test for radium-226, a radionuclide that is probably expected in flowback water from the NT shale formation (without knowing the current chemical composition of the NT shale, this background testing must be completed and continuously monitored daily) • Testing continuously for total dissolved solids (TDS) and chloride, which are expected to be high

[36] Rahm, D. (2011), Regulating hydraulic fracturing in shale gas plays: The case of Texas, Energy Policy, 39, 2974-2981

[37] Brown D, Weinberger B, Lewis C, Bonaparte H. (2014). Understanding exposure from natural gas drilling puts current air standards to the test; Rev Environ Health. 2014;29(4):277-92. doi: 10.1515/reveh-2014-0002.

[38] Ohio Legislation Introduced to Ban Fracking Waste Injection Wells." Eco Watch. Eco Watch. Web. 21 May 2013. <http://ecowatch.com/2013/ohio-legislation-ban-fracking-waste-injection-wells/>.

	• Throughout the treatment process at a wastewater facility, sediment and sludge is accumulated from the water from a filtration process, however most water treatment filters (separation technologies) fail to remove all of the radioactive liquid from the solid contents. This material, along with filters, is removed from the wastewater at the wastewater treatment plant, and then needs to be disposed of. The solid waste, still coated with radioactive waste-water, is then sent to the municipal landfill (potentially) • NT government will need to question whether the treatment plants are able to remove radium in solution, as research into treatment plants in the States can adequately describe how this is done
Mental health and wellbeing	**Mental Health:** • A recent paper in the Journal of Environmental Psychology; *Fracked: Coal seam gas extraction and farmers' mental health*, by Methuen Morgan, 2016[39]. This PhD thesis was presented to me in late October 2016, and is the first peer-reviewed health study that academically supports my views . • In Morgan's own words, "…you must remember that my research averages the data, however the individual data on some farmers dealing with CSG is very scary…". Morgan's comments are consistent with 4 other landholders who have personally declared to me that they have considered taking their lives due to the external stress that CSG is having on their daily lives. This is a minimum of 4 additional families that would be spared from the unnecessary pain and loss if there was a balance in legislation. How many other farmers are too frightened to speak up? • Key points from the research paper are: o Exploratory factor analysis revealed that CSG items added two unique dimensions to the Edinburgh Farming Stress Inventory (EFSI) o Off-Farm CSG Concerns (concerns about possible impacts of CSG extraction on human health, communities and the environment) o On-Farm CSG Concerns (potential CSG impacts on farm profitability, disruption of farm operations and privacy) o Farmers in the CSG-Stressed and Globally-Stressed profiles exhibited clinically significant level of psychological morbidity o Potentially harmful impacts, the primary burden for which will be borne by agricultural communities, may constitute an additional significant stressor facing farmers – many of whom already carry a substantial stress burden associated with agricultural production o Although not all stress is detrimental, severe or prolonged stress can have serious impacts on the physical and mental health of farmers o While there is empirical research examining psychological impacts of extractive industries such as coal mining, we were unable to identify any studies that assessed the association between CSG stressors and farmers mental health outcomes o Section 3.5 Farm stressors predicting mental health: found that Off-Farm and On-Farm CSG Concerns were both significantly correlated with anxiety, but did not explain significant unique variance in this mental health outcome after controlling for the other stress dimensions o Section 3.6 Farm stress typology: CSG-Stressed farmers constituted the third largest segment. The main distinguishing feature of the CSG-Stressed group was the elevated scores related to Off-Farm and On-Farm CSG Concerns. The Globally-Stressed farmers included mean scores for Off-Farm and On-Farm CSG Concerns that fell within the "high to very severe" range. In terms of mental health, members of the Globally-Stressed segment on average were characterized by "clinically significant" levels of psychological morbidity for depression, anxiety and stress reactivity o Section 4.2 Farmer stress profile: Our results suggest that, even in the absence of such traditional stressors, new stressors associated with emerging industries, such as CSG, may adversely affect farmers' mental health. Thus, the elevated symptoms of depression in this segment may reflect demoralization (feelings of uncertainty, helplessness or hopelessness) associated with these specific stressors o CSG operators could assist in reducing the stress burden on farmers by specifically addressing farmers' concerns during negotiation and operational stages (Note: currently a Chinchilla farmer is distressed about one company promising the world during negotiations and is now regretful as he is watching his property being trashed and agreements/promises have not been carried out by the company) o Globally-Stressed was considered from a mental health perspective was the most worrisome segment. The results suggest the need for proactive identification and early intervention for

[39] Morgan M, Hine D, Bhullar N, Dunstan D, Bartik W., Fracked: Coal seam gas extraction and farmers' mental health., Journal of Environmental Psychology 47 (2016), pg 22-32

farmers stressed by multiple factors, including unknown issues associated with the CSG industry
    - Insights about the association between CSG concerns and farmers' mental health may assist regulators and industry to review and adjust their practices to reduce unintended community impacts (hence the urgent need for this Coroner's inquest)

DEATH OF GEORGE BENDER – CHINCHILLA, QUEENSLAND

There are three causations surrounding the death of George Bender:

- Conduct of Origin Energy
- Conduct of Queensland Government, lack of balanced legislation or balanced rights of landholders
- Conduct of Industry Bodies; Gasfield Commission, CSG Compliance Unit, in providing minimal to nil assistance to landholders

*This component of the submission will focus on the primary culprit behind George's death – **Origin Energy**.*

- Refer to Appendix C for abstracts of the Origin Energy Health, Safety and Environment Policy and their Code of Conduct Policy ORG-PCMS-POL-003.
- Origin Energy was in negotiations with George Bender on a Make Good Agreement (MGA), at the same time as Origin pushed and pressured for a parallel Conduct and Compensation Agreement (CCA) for CSG Wells.
- Therefore, George Bender was a **BUSINESS PARTNER** as well as a **COMMUNITY MEMBER**
- It is clear from the extracts provided in Appendix D, from Origin Energy's own documentation that there was an implied DUTY OF CARE under the Code of Conduct and a LEGAL REQUIREMENT to conduct themselves with **due care**. The ethical corporate conduct was to:
    - No harassment or bullying, to treat others with respect
    - Respect the rights and interests of communities and business partners
    - Deliver on commitments and to not act, is a decision in itself
    - Care about the impacts on community
    - Demonstrate concern for others
    - No bribery
- Brief examples of experiences with Origin Energy, Regional Manager – Robert HART
    - George refused to shake the hand of Robert Hart after a meeting regarding negotiations due to the conduct and the unprofessionalism dealings of HART. HART was deliberately conducting himself in a manner that was in breach of the Code of Conduct in its entirety.
    - Origin letter dated 13th May 2014 Make Good Agreement offer with emphasis on the following elements of this letter included:
        - Origin free claim over the 5 ML water license into the Walloon Coal Measure; no compensation offered
        - Additional Payment = "bribery", an attempt to bribe George and Pam Bender with $200,000 to sign a Conduct and Compensation Agreement (CCA) for proposed wells and associated infrastructure development on 'Chinta' by 1st October 2014
    - A MGA was subsequently sent on 14th May 2014, and contained several errors; errors that had serious consequence to the outcome for George Bender. HART acknowledged that he did *not bother reading* the CONTRACT. This is a failure to deliver on commitments under the Code of Conduct, in addition to the incompetent behaviour of the Regional Manager. An email from HART on 16th May 2014, "I will also check it [MGA] this time before we send it"
    - HART is best described as being driven by his ego. In asking others who are disconnected from our own events on 'how best to describe HART', many colourful terms were provided but a common thread was 'smartarse', 'bullshit artist' and 'never trust a HART'. A verbal conversation between HART and George, had HART saying to George that his proposed request for the Regional Manager's annual salary for any wells placed in cultivation was, "we [Origin] don't want to short change you". This is an indication of the outright disrespect shown by Origin Energy's management team to a man aged 68 years and a well-regarded member of the Chinchilla Community. How could any form of negotiation take place, and what good reason would any landholder allow a disrespectful, lying, cheating and thieving company onto their property?
- Brief examples of experiences with Origin Energy, Manager Land Access Agreements – Mark TURNER
    - TURNER came onto the scene in March 2015, and was from the get go, an arrogant, condescending, manipulative, cunningly deceiving, vicious, malicious, disturbingly psychopathic, volatile to the point of being pure "evil" and most certainly a "bully"
    - Wikipedia describes bullying as *''an act of repeated aggressive behaviour in order to intentionally hurt another person, physically or mentally. Bullying is characterized by an individual behaving in a certain way to **gain power** over another person. It may include name*

*calling, **verbal** or **written** abuse, physical abuse, or coercion. Bullies may behave this way to be perceived as popular or tough or to get attention. They may bully out of jealousy.*''

- TURNER'S aim was to overpower, control, dominate, and subdue his target, George Bender.
- TURNER bullied only to feel powerful while he degraded and intimidated George; in TURNER'S mind; his world, his arena, his oxygen.
- George's solicitor has refused to repeat the words spoken by TURNER during the negotiations of the sale of 'Chinta'. Indicating the level of malicious behaviour that was also being dealt to Bender's legal entity engaged by the landholder, about the landholder.
- The verbal conversations between George and TURNER had significant impacts on George's behaviour. George would never repeat TURNER'S words to his family, but George would undoubtedly repeat them to himself, causing deep emotional trauma.
- TURNER is the individual within Origin Energy who pushed a man to breaking point. TURNER is also now employed with the same Law Firm who manages APLNG land purchases – Concerns are raised surrounding the turntables within this industry!
- Origin recognise that not to act is an action in itself; so why did it take Origin Energy **805 days** (**555 business days**) to make reasonable endeavours to enter into a MGA, that under the legislation is to take 40 business days? As expressed by a legal email to Origin Energy on 20th March 2014 "*Our client is extremely frustrated and disappointed with the delay in response to their offer made to Origin over one and half months ago…*"
  - It was then discovered that companies were applying for extensions to the timeframes under the Act but, no notifications were provided to the impacted party. (This is where the Government's is responsible for the death of George). In uncovering this fault in the law, only adds to the already fuelled levels of frustrations.
- TURNER had also stated to the Bender's that we were NEVER going to speak with Natasha Patterson who is currently the General Manager for Origin Energy, who is just another government individual who walked through the busy revolving doors and sold her soul. Look at Patterson's impressive career within the Queensland Government as a EHP personnel, and there is little doubting that this one is truly a recalcitrant:
  - Senior Corporate Counsel, Origin Energy**, 2010** – 2011 (1 year)
  - Assistant Director General, Department of Environment and Heritage Protection**, 2010 – 2010** (less than a year)
    - Immediately prior to leaving the public service, Natasha held executive management roles with a focus on environment and natural resource regulation. Natasha led initial changes in relation to the regulation of the then emerging coal seam gas industry (including in relation to impacts on underground water), and the response to issues arising in relation to Underground Coal Gasification activities in Queensland.
- *REFER TO 'LAND ACCESS' SECTION BELOW FOR ADDITONAL EVIDENCE ON THE BEHAVIOUR OF ORIGIN ENERGY AGAINST GEORGE BENDER*

THE GAS INDUSTRY IS RESPONSIBLE FOR CAUSING PSYCHIATRIC INJURY

- It is too common and too easy to categorise suicide as being mental illness and depression in today's world, where everything must have a 'title'. So, what happened to George on 13th October 2015?
- The Bender family have ruled out mental illness and depression, as there were no physical signs of either. George displayed no changes to his behaviour, and this can be backed up with solid evidence:
  - On 13th October 2015, George was drafting a response to Origin Energy regarding the most recent trespass by Leighton Contractors, the letter was found left on the table where he always sat, is this a man who had pre-determined that he would take his life within the coming hours or minutes?
  - On 13th October 2015, he booked himself into a Pig Conference being held on 19th October 2015
  - Spoke to Pam about buying another property in Chinchilla less than 2weeks earlier…not just any farm, but a farm that required a lot of work and his comment was…I want to start a dairy farm (at 68yrs old…this is not the behaviour of someone who is depressed or wanting to give up)
  - No changes to use of alcohol or drugs, in fact, George barely drank and was easily satisfied with 2 beers…a pleasant change to his drinking behaviours of his younger years
  - George woke every morning at 5am, turned on the radio and was up feeding the pigs by 6am and back to make breakfast for Pam by 7:30am – even on the morning of the 13th October 2015

- George apologised to his family while he laid dying on the hospital bed, "I am sorry, I shouldn't have done 'it', my brain snapped". What did George mean by "my brain snapped"??

- The following explanation has been researched from A page from Bully Online, website of the UK National Workplace Bullying Advice Line:
- Whilst some people decide to end their life because of despair, others take their life because they see it as a "logical step". It is thought that the former category (despair) is the result of "mental illness", whilst the latter (logical step) is because of "psychiatric injury". The difference is important because injury has an external cause - in other words, something - or someone - is liable. The differences between mental illness and psychiatric injury are often not recognised; understanding the differences could alter the verdict, perhaps from *suicide* to *manslaughter*.

THE FORGOTTEN IMPORTANCE OF PSYCHIATRIC INJURY:

- Over time, the symptoms described in Appendix B result in psychiatric injury, which is not a mental illness. Despite superficial similarity, and comments (both direct and implied) from those around you, there are many distinct differences between psychiatric injury and mental illness including:
    1. mental illness is assumed to be inherent (internal) whereas psychiatric injury is caused by something or someone else (external) – who is liable;
    2. an injury is likely to get better (if the cause is removed);
    3. the person suffering mental illness exhibits a range of symptoms associated with mental illness (paranoia, schizophrenia, delusions, etc.) but not with psychiatric injury, whereas the person suffering psychiatric injury will typically exhibit a range of symptoms (e.g. hypervigilance, hypersensitivity, obsessiveness, irritability, fatigue, sleeplessness). Those symptoms are only associated with psychiatric injury and not with mental illness.
- (Obsessiveness is emphasised, as the invasion of the unconventional gas industry became a living and breathing entity of its own…George had to feed this entity order to control it…the industry possessed George's mind, it slowly consumed him and George obsessed over it)
- A full table showing the differences between psychiatric injury and mental illness is provided in Appendix E.
- Consequently, there is strong believe that there is one cause of suicide which has been overlooked – Abuse! This can be abuse in all its forms - bullying, harassment, stalking, domestic violence, sexual abuse etc. It causes prolonged negative stress which cumulatively amounts to psychiatric injury. A prominent symptom of psychiatric injury is "reactive depression", which then gives rise to thoughts of suicide.
- The number of adults who commit suicide because of bullying, harassment and violence is unknown, but our guess is that bullying is a significant factor in the number of suicides by adults. In Australia, the 2013 ABS state that for men (age group 65-69), there were 86 deaths, representing 1.3% of all deaths.
- How many adult suicides are caused by bullying? Given the above background, consider the following:

    bullying (an abdication and denial for the effect of one's behaviour on others)...
    causes...
    prolonged negative stress (psychiatric injury)...
    which includes...
    *reactive depression (the cause is external - **someone is responsible and liable**)...*
    which results in...
    fluctuating baseline of one's objectivity (balance of the mind disturbed)...
    which leads to...
    contemplated suicide (being viewed as suffering mental illness)...
    culminating in...
    attempted suicide (cry for help)...
    which may end in...
    *suicide (**manslaughter – causation**)*

- If that wasn't enough, add to the toxic cocktail, hypertension (genetic). The cumulative pressures placed on landholders to negotiate timely, with no avenue to request for extension of times under the Act…companies are able to manipulate the Act and the Government to suit their own situation, meaning there is no pressure applied to companies due to their own inaction.
- George, didn't receive bully or threats just from Origin Energy; QGC, Linc Energy and Arrow Energy applied the same over the 10yr period. Examples have been provided within this submission.

The Legal Responsibility of Gas Companies

- There is now evidence that there is a breach of duty of care by Origin Energy (with extension to the Queensland Government), under the Code of Conduct. It would also be worth considering the breach

under the Work Health and Safety Act (2011), and personal injury. There is case law for personal injury caused by bullying (although there have been settlements which are subject to gagging clauses).

- The cumulative impacts on George can be clearly evident by completing the Timeline of all events across all companies during the 10 years. (Timeline will not be provided to the Senate). Evidence is able to identify the first stress breakdown, and of course the second stress breakdown resulted in George taking his life. There is precedence in law on both accounts of first and second stress breakdown.
- One example of case law (UK) (In July 1999 Beverley Lancaster won her case for stress against Birmingham City Council, and in September 2000 in the case of Waters v. London Metropolitan Police the UK House of Lords judged that an employee (or in this case an office holder) has the right in law to sue for negligence if bullying and harassment which the employer knew about but failed to deal with resulted in psychiatric injury.
- Second example of case law (US) (August 2005: Suicide over livestock grazing at Carrizo Plain National Monument, California, casts shadow on conservation battle; US Bureau of Land Management bosses' treatment of Marlene Braun exhibits hallmarks of bullying.)

Allow us to define "Breakdown"

- The word "breakdown" is often used to describe the mental collapse of someone who has been under intolerable strain. There is usually an inappropriate inference of "mental illness". "Breakdown" and "mental illness" are lay terms and mean different things to different people, however breakdown can be defined as either:
    1. Nervous breakdown or mental breakdown as a consequence of mental illness
    2. Stress breakdown is a psychiatric injury; which is a normal reaction to an abnormal situation
- The two types of breakdown are distinct and should not be confused. A stress breakdown is a natural and normal conclusion to a period of prolonged negative stress; the body is saying "I'm not designed to operate under these conditions of prolonged negative stress so I am going to do something dramatic to ensure that you reduce or eliminate the stress otherwise your body may suffer irreparable damage; you must take action now".
- A stress breakdown is often predictable days, sometimes weeks in advance as the person's fear, fragility, obsessiveness, hypervigilance and hypersensitivity combine to evolve into paranoia (as evidenced by increasingly bizarre talk of conspiracy as such). If this happens, a stress breakdown is only days or even hours away and the person needs urgent medical help. The risk of suicide at this point is heightened.

HOW IS ORIGIN ENERGY LIABLE FOR MANSLAUGHTER?

- The critical date is around the 14th May 2014. This was after the following events:
    - the meeting with Robert Hart on the 24th April 2014, whereby George refused to shake Hart's hand due to the poor manner in which negotiations were taking place and the attempt to cheat, bribe George out of a reasonable MGA
    - receiving the first MGA Letter dated 13th May 2014 of which George Bender was formally bribed $200,000 to sign a CCA for well construction on 'Chinta'
    - and critically, after the meeting on 11th December 2013 whereby George Bender made it clear that the MGA needed to be finalised before there was any discussion around CSG wells (refer to DRNM letter dated 12th December 2013, copy can be provided)
- The events around the 14th May 2014 was the day that George "cried out for help", not with an attempt at suicide, but a vocal statement to Origin Energy, that if they continued to negotiate in the manner that they were that included bribery, bullying, intimidation, that he would take his life.
- It is known that when a person vocal the threat of suicide, that this is a cry for help, a sign of "psychiatric injury" as opposed to the person actually wanting to take their life, "mental illness"
- It is the family's opinion that George would rather take the life of those responsible within Origin Energy, but knew from recent experiences with one local and QGC that the company would more than likely press criminal charges
- Origin Energy did little to reduce the stress on George, as in March 2015 Origin Energy placed Turner in charge of the negotiations. Over the course of the MGA, George had up to 6 different Origin Energy personnel, and having to repeat and reteach each one on his land access/compensation requirements
- On 30th July 2015, Origin Energy forced a Contract of Sale for the purchase of 'Chinta'.
- The events that led up to the 14th/15th May 2014 is evidence of the first stress breakdown, and the events that led to George taking his life on 13th October 2015 is the evidence of the second stress breakdown, with the critical direct action by Origin Energy on 30th July 2015 to force the sale of 'Chinta'.
- The above evidence provides clear rational and logical evidence that there was causation (manslaughter) surrounding the death of George Bender, due to the direct actions and inactions of

Origin Energy. The family is unequivocal in their belief that Origin Energy be held accountable for death of George Bender.

- Given our personal 'on-the-ground' experience, the volume of correspondence and stress that this industry places on a landholder requires serious reforms across the Land Access Framework, legislation and providing the landholder with an avenue to go to for genuine assistance (where their cries for help will be heard with sympathetic ears and an empathetic heart), such as:
    - One (1) tenement holder in negotiation with a landholder. Therefore, the first tenement holder to commence negotiation automatically bars any other tenement holder from negotiations, until that first tenement holder has decommissioned and moved on.
    - Independent Resource Ombudsman; this is long overdue, and far too late for George Bender. Strong powers need to be provided especially on Code of Conduct matters, and in the case of bullying, to investigate and determine criminal offences where applicable.
    - Make it illegal for a Resource Company to force the sale of a property during negotiation periods. The option can only be used in the first contact with the landholder, and remove the ability for the Resource Company to use a sale of a property to commence CCA process and hence a threat to Land Court.
    - Minimise the direct contact between Resource Companies and Landholders. Companies seen to be cutting out the legal representatives are to be heavily penalised
    - Minimise the number of extension of time requests, maximum of two (2) (say), and after the second extension of time, significant penalties apply. Also, the landholder is to be provided with an opportunity to dispute all extension of time requests
    - Immediately removal of the Gasfield Commission as they are just another layer of stress and frustration

Forced Contract of Sale 'Chinta' by Origin Energy:

- George made it quite clear to the family that he did not want to submit a counter-offer back to Origin, to put it simply, at that point in time George did not want to sell 'Chinta'
- Payment of professional fees only if contract of sale was agreed to. This contract term goes beyond unconscionable, and is a dishonest incentive to influence George's right to consider and negotiate terms, and an attempt to influence the legal advice being received.
- Offer failed to acknowledge the economic realities to the sale to the family (total financial loss)
- Letter dated 28th September 2015 from Bender's Solicitors:
    - "My clients are upset at the lack of consideration in the current offer by Origin to their lives as farmers of the land and the disregard for the overall costs and impacts to my clients and their families of your proposition. My clients feel that Origin have little regard for the well-being of landholders such as my clients and will happily see my clients suffer financial loss and hardship in order to accommodate Origin's offer".
    - "My clients' view your response to their request regarding professional fees as an attempt to further bully and intimidate them in regards to their land and only reinforces the unfortunately negative view shared by my clients and others in the community as to dealings with Origin"
    - Origin Energy actions against George Bender, is the sole reason he took his life and forever destroyed his family.

Wellbeing:

- Radium concentrations in bones can give rise to leukaemia, and the actual symptoms from radiological exposure may not occur for years to come. With these materials persisting in place for decades, due to illegal disposal and or land contaminated by radium in produced water can pose a threat to people working or living nearby for thousands of years
- With the amount of acute health issues popping up throughout Pennsylvania and now Ohio, believed to be in response to drilling practices, there are concerns that this is just the tip of the iceberg when radium eventually migrates into their source water for public drinking supplies and leaches out of landfills. When ingested, radium concentrates in bone and can increase the probability of leukaemia. The serious health effects as a result of radiological exposure are not readily apparent as victims first endure a latency period. This means that although residents could be currently exposed, their symptoms may not appear ***until years from now***. Australian living in gasfields in both Queensland and New South Wales are all experiencing health impacts that include nosebleeds, skin rashes, eye irritations, seizures, headaches, migraines, hospitalisations, children missing many days from school and mothers who miscarriage
- Queensland Health undertook a health study in 2013 (click here), this report is flawed for the following reasons:
    - Gas company undertook the air monitoring data for 1 week only. Hence conflict of interest and the company was able to shut down that particular gasfield
    - No health assessment was undertaken on any resident

	○ Recommendation – no follow up by the department even with more evidence of serious health concerns ○ Additional evidence can be sourced here http://www.ntn.org.au/wp/wp-content/uploads/2013/05/Symptomatology-of-a-gas-field-An-independent-health-survey-in-the-Tara-rural-residential-estates-and-environs-April-2013.pdf and http://www.ntn.org.au/wp/wp-content/uploads/2013/12/CSG-Health-Impacts-Dr-W-Somerville.pdf **DISCUSSIONS:** • Baseline health reporting and testing on all humans living in the proposed gas development area. Advise that a minimum of 5 years of testing is obtained prior to any gas development proposal is approved • What is the proposed number of truck movements to deal with the waste from the industry? Any movement on roads will increase the risk of public health (and environmental) exposure to toxic chemicals if an accident was to occur • What is the limit to transport radioactive material, especially radium-226 (or whatever specific radioactive material that is associated with the NT shale basins) • What is the insurance required to cover any potential transport incident? • **Noise and Light Impacts** ○ Noise impacts experienced in the gasfields include: ▪ Screw Compressors approx. 4km at a meter reading of 32.7dBA (inside home) at 3am, which exceeds the Environmental Authority of 23dBA ▪ Water pipelines readings at 82dBA, at source ▪ https://www.facebook.com/john.jenkyn/videos/1924347247798538/ ○ Light impacts from flaring turns night into day, stars disappear from the night sky and transforms darkness into a dangerous red glow. This is best to be experienced as photos and descriptive words can never replace real-life witnessing of intensity of the flares. Please visit the gasfields and experience the health, heat, noise, light of an operational gasfield.
Diesel Fumes	• Benzene is a component of diesel fuel, which is used by compressor stations, trucks, and in this game of drilling (fracking) will cover the landscape and transform a simple horse ride into a health hazard • Benzene is a potent carcinogen • Toluene, like benzene is another VOC that is a component of diesel and other products used in hydraulic fracturing fluids, and is found in the condensate produced at compressor stations • Reported incidents of diesel fuel spilled during transfer between trucks • Landholders from Bradford County, outskirts of Philadelphia speak of trucks sitting in a line, idling and the smell of the valley of diesel fumes • Will tourists continue to visit the area if drilling traffic and diesel fume asphyxiation?
Physical Safety	• My personal opinion is that I am concerned about the safety of gas workers now that landholders have been pushed too far
Cumulative Risks	• More common nuisances include noise pollution, from drilling and all associated infrastructure such as compressor stations, treatment plants. One resident recently made contact with myself claiming to have lived in the area for 20 years, and is 19km from the QGC Kenya Treatment Plant and can no longer deal with the constant noise. • It is advised that the Panel visit a fully operational gasfield to determine the cumulative health impacts for themselves. An invitation has previously been offered to the Panel

Aboriginal People and their Culture

we are all visitors to this time, this place. we are just passing through.
our purpose here is to observe, to learn, to grow, to love...
and then we return home – Australian Aboriginal Proverb

Value	Comment and Feedback
Land ownership	With all due respect to the traditional owners and aboriginal people, the intimate details of their culture is outside my area of knowledge • A contact name is able to be provided of a Traditional Owner within the Chinchilla district, who is in a better position to detail how the industry bypassed the true Traditional Owners, the failures of the Native Title Act that has allowed
Benefits	With all due respect to the traditional owners and aboriginal people, the intimate details of their culture is outside my area of knowledge
Culture, values and traditions	Within Chinchilla alone, I am aware of 3 issues where the Gas Companies have destroyed Aboriginal sites. • Current landholder in dealing with QGC in the area disclosed that the company had a CSG Well that would require the removal of a scare tree. The company representative informed the landholder that they could do whatever they want, including removal of aboriginal sites.
Community wellbeing	With all due respect to the traditional owners and aboriginal people, the intimate details of their culture is outside my area of knowledge
Aquatic and terrestrial ecosystems	With all due respect to the traditional owners and aboriginal people, the intimate details of their culture is outside my area of knowledge
Cumulative risks	With all due respect to the traditional owners and aboriginal people, the intimate details of their culture is outside my area of knowledge

Social Impacts

It is important that the local community decide to grant the gas industry a 'social license' prior to the industry setting foot into their homes. This 'license' must be achieved through groundwork and not through buying a 'license', as this is not a true indication that the gas industry has the full support of the community.

The Panel must first listen to the community and understand their concerns. When it is your family home that is in the path of an multi-national gas mining company; whose voice should the government support first? Who is the elected government meant to represent at all times?

The people.

Value	Comment and Feedback

Housing and rents	**Key points from article:** (2014): http://www.abc.net.au/news/2014-04-28/boom-bust-chinchilla/5359472
	• The rise in rents make it difficult for many people not on a 'resources income', to live in Chinchilla.
	• Lyn McCullough from the bakery says she's lost staff because people couldn't afford to stay in town.
	  ○ "You pretty much employ all the locals but that's been a bit hard too because a lot of locals have moved out because of the rising rent prices and the rising house prices," she said.
	  ○ "I think we've had one or two who have actually ended up moving to Toowoomba because they couldn't afford the rent here."
	  ○ "You sort of can't blame them because well, a lot of people have been paying maybe $150-200 a week for rent here and then all of a sudden it doubles or triples."
	• The average house price in Chinchilla is about $400,000 which is back from $420,000 about a year ago.
	• In fact, from October 2012 to October 2013 Chinchilla's residential land values **decreased** by 6.9%.
	• "I'm only aware of three transactions that have occurred in the Western Downs that have involved properties encumbered with three or more coal seam gas wells to date, and I'm yet to see a premium paid for the annualised compensation amounts that were in place as part of their respective conduct and compensation agreements."
	• "We can't accommodate people here on site and it's really tough. We've lost a staff member because they couldn't afford the $450/$500 dollars a week rent. We do our best to try and pay our staff really well but obviously we can't compete with and industry with billions to throw around. Katie Lloyd, Chinchilla region farmer
	• The agriculture industry which has been the mainstay of the town for two centuries, is struggling to come to terms with the resources activity in the area.
	• "It's been a really challenging time for us as a family trying to balance this push for coexistence. We've struggled in a big way with watching this development unfold."
	• "We don't have that ability to say no and we're essentially forced into a relationship and we haven't been able to sit back and assess it and weigh up the pros and cons of this industry. We just have to take it as it is," she said.
	• Even though the Lloyds live well out of town, the housing difficulties and the cost of residential housing has also played a role in their business.
	• "The staffing issue is one of our biggest problems here. We employ six people but every time we need to employ someone else, the first question that always come into play is accommodation."
	
	Key points from article (2015): https://www.australianmining.com.au/news/mining-house-prices-heading-south-with-commodities/
	• Chinchilla and Miles will also see substantial **decreases** of 15 and 10% respectively, as the demand for gas industry construction workers and drill crews falls, and the industry transitions into the production phase.
	
	Key points from article (2015): http://www.abc.net.au/news/2015-06-27/coal-seam-gas-construction-boom-ends-in-qld/6575922
	• "The people that have invested in the houses are probably worried because their rents have halved," he said. "There's something like 300 rentals available in Chinchilla between all the agents. "Two years ago we might have had 30 or 40 between us all."
	
	Key points from article: Lessons CSG Operators can learn from Southern Queensland Towns http://gastoday.com.au/news/lessons_csg_operators_can_learn_from_southern_queensland_towns/91959
	• Chinchilla is reported now to have 230 vacant houses, or a 20% vacancy rate. One real estate agent described the situation as "disastrous".
	
	Key points from article (2015): http://www.dailytelegraph.com.au/realestate/news/perth-wa/the-towns-where-property-prices-went-from-boom-to-bust/news-story/f2ad783a67d98bfa90bf7d9118986a99

	• Weak housing markets include Queensland towns Gladstone and Moranbah, along with Western Australia's Port Hedland, Karratha and Newman and NSW's Muswellbrook. All these towns are in mining areas. • Hotspotting director Terry Ryder explained that the major price falls that occurred in these towns were driven by massive spikes in the supply of new housing • The increased supply was matched by falling demand brought about by changes in the resources sector. • Gladstone, Qld: o The construction phase for three LNG facilities created a house price boom in Gladstone, but it started winding down in 2012 as workers began seeking jobs elsewhere and developers started constructing a mass of dwellings. Many of the workers that remain in the area have been accommodated in camps, circumventing the local housing market. • Surat Basin, Qld: o The Surat Basin, just west of Brisbane, is a major coal seam gas field. Towns such as Chinchilla and Roma once boomed — until oversupply killed their markets. There are about 15,000 resources workers in the area, but 94% are now accommodated in workers camps, according to Hotspotting.com.au. **Key points from article** (2017): http://www.northerndailyleader.com.au/story/4562970/what-does-the-csg-industry-do-to-the-price-of-nearby-houses/ • When the CSG industry came to town, the value of her unimproved land tripled in three years, before dropping more than $20,000 below its original value. • "My unimproved land was worth $58,000 prior to the boom – between 2011 and 2014, when the CSG party was in town, it rose to a whopping $182,500 and my rates increased by almost 100%," Ms Auty said. • "Every year since that peak the value of my land has dropped but rates have continued to rise. I just got a valuation notice this month and it's dropped to $35,000. • "Coal seam gas is like a really short party with the worst and longest hangover. The money is there for a good time, not a long time, and locals are left much worse off." • Kylie Hausler said she sold her home to take her family away from the Tara gasfield and lost $100,000 on the property. • High rents also forced out low-income renters. "Our pensioners, retirees, sole parents, single-income families and non-industry workers left town in droves," Ms Auty said. • "What has happened in Chinchilla and surrounds is a clear indication of an out-of-control situation that impacts vulnerable people who have nothing to do with the gas industry,"
Insurance	**Current Framework:** • **NSW Chief Scientist and Engineer state:** o The existing regulatory framework in NSW requires petroleum licensees to lodge a security deposit with the Government; an amount determined by an estimate of rehabilitation costs provided by the licensee and reviewed by the Office of CSG o In some jurisdictions, a bank guarantee or financial assurance is lodged in place of the security deposit and cash bonds e.g. QLD 99% of security is by way of financial assurance o *Security deposits do not apply to pollution events* o The department can require the licensee to take out insurance, but this is not the norm; often evidence of an applicant's financial standing is sufficient o *Landholders have been unable to secure insurance to cover environmental damage by a third party* o *Some insurers have also implied that existing landholders' cover would be invalidated by CSG operations* • **Hicksons Lawyers state:** o Security deposits typically only cover site rehabilitation, *not beyond the tenement or long term damage* o In WA, it has been estimated only 25% of rehabilitation costs are in fact covered by security deposits o *Insurance brokers Marsh suggest that CSG risk in NSW (and in Australia generally) is underinsured or not insured at all* o Many CSG operators are likely to hold a third-party liability (TPL) policy which would only cover 'accidental' pollution, and would *not extend to 'natural resource damage' i.e. aquifers* o Level of coverage may be inadequate (as low as $5-10M for small operators) o A TPL policy is not appropriate nor is it targeted to cover gradual onset, off-site groundwater contamination, which is the main perceived risk of CSG operations identified by the insurance industry

	• **Alternative Framework:**
	  o A more comprehensive form of pollution legal liability insurance is now available on the market to cover pollution and natural resource damage both on-site and off-site and for the benefit of the insured, third parties and contractors – which would cover gradual, long term loss and damage e.g. groundwater
	  o Another advantage of a pollution legal liability policy is that it is generally only written if the insurer has a better understanding and satisfies itself as to the insured's claims history, environmental record, planned operations, technical skills and supervision and systems of operations
	  o WA maintains a Mining Rehabilitation Fund which would be a suitable model for NSW. Extend to all States and Territories
	  o In the case of CSG exploration and production a reduced security bond could be relied on for immediate well site damage and the proposed CSG rehabilitation fund could be used for remediating the cumulative and long term effects on the environment beyond the well site or affected title
	
	Health Insurance:
	• Will Health Insurance companies apply a premium to individuals that live in a gasfield within the near future? Who is expected to pay for this premium, the individual who had no say in their homes becoming a gasfield?
	• Do the gas companies owe a duty of care when proposing to drill near a resident with cancer, lung issues, heart patient, disabled children?

Health Services	• GISERA report – Community Functioning and Wellbeing survey 2, is extremely vague when it comes to the topic of Health Services.[40] • 1300 Health – this is believed to be a controlled system to place impacted families into a loop to become frustrated and give-up. That is, their see their GP who states that they must call the 1300 HEALTH number do to their health issue being related to CSG, they call the number to be advised to see their GP. • Doctors are not experienced in health issues related to gas mining. It is impossible for health practitioners to have the knowledge on illnesses, as the gas industry do not disclose the chemicals used in their activities **DISCUSSIONS:** • Extensive research is required to be undertaken by an independent third party to assess the impact on health services during the peak construction period and how the local community is not adversely impacted

Education	**The below links are the words from a Chinchilla School Teacher, Vicki Bock:**
	• https://www.chinchillanews.com.au/news/teacher-speaks-up-for-the-young-people/3057417/
	• https://www.youtube.com/watch?v=sYSIk15DUso (at 23:00mins, Vicki Bock – School Teacher from Chinchilla and Youth Worker).
	  o One thing that our district is now suffering from is the impact of CSG with our kids. "It's not just the blood noses, it's also the psychological impact.
	  o "I've sat at tables with parents who say, 'My 12 year old daughter is now self-harming because she doesn't know how to deal with what's going on in our family because of this gas.' I've seen five-year-olds screaming at their mothers, 'Stop talking about gas!'"
	• On a favourable note; there is the possibility of the opportunity of rural schools becoming more multi-cultural, however this would be dependent upon the nature of workers into the area i.e. FIFO/permanent families

Infrastructure	• As witnessed in the Chinchilla district, new infrastructure was built however it was initially only infrastructure (roads etc.) for the companies to access their own private facilities and very little benefit for the community. So, while the companies had a new double lane bitumen road leading to a CPP, with no public benefit, a family is unable to get their children to school after 5mm rain as the gravel road has never been maintained. • Only after 10yrs of the industry being in the district has there been resurfacing of roads the could benefit the wider community. Please note, that these roads were more likely at their maintenance program as not having been upgraded in 30-40 or 50 years

[40] GISERA, *Changes between 2014 and 2016 in the Context of Coal Seam Gas Development,* https://gisera.org.au/project/community-functioning-and-wellbeing-2/ viewed 23 April 2017

Livelihoods	**Review of the Socioeconomic Impacts of Coal Seam Gas in Queensland – Office of the Chief Economist** https://industry.gov.au/Office-of-the-Chief-Economist/Publications/Documents/coal-seam-gas/Socioeconomic-impacts-of-coal-seam-gas-in-Queensland.pdf • This industry report was compiled from meetings with stakeholders…all of which were industry only stakeholders; the picture below depict the stakeholders involved: -  • Page 7 (copy below) details some very interesting facts that cannot be ignored as to the blatant one-sided reporting that has been considered in this report: o *We made a conscious decision **not** to meet with local landholders and community groups. These groups have done extensive consultation with gas companies, governments, and with social science researchers, and there was considered to be a very real risk of research fatigue. Instead, the review has relied on the **perspectives of the GasFields Commission** and the researchers who have been working very closely with these communities.* • The above statement is to be considered as a complete insult to all local communities, as amongst the most impacted landholders within the Chinchilla region, not one was interviewed or knows of any research completed. • There was no facts provided on the data sample used during the apparent 'extensive consultation' that was undertaken

Literature was identified through an extensive search, drawing upon the annotated bibliography of CSG by Hunter and Taylor.[1] We gave more weight in the review to studies which we assessed to be more rigorous and higher quality. Two of the research organisations undertaking high quality research into the socioeconomic impacts of CSG development are Gas Industry Social and Environmental Research Alliance (GISERA), and the University of Queensland's Centre for Coal Seam Gas (UQ-CCSG). These organisations also helped us identify relevant grey literature to be considered as part of the review.

The review of research was supplemented by a number of meetings with stakeholders in the CSG sector in Queensland to discuss experiences and 'ground-truth' findings from the literature. The stakeholders included:

- social science and other researchers, including from the Gas Industry Social and Environmental Research Alliance (GISERA), and the University of Queensland's Centre for Coal Seam Gas (UQ-CCSG)
- Queensland Government representatives, including the Office of Groundwater Impact Assessment (OGIA) and the Department of Natural Resources and Mines (DNRM)
- representatives from the GasFields Commission Queensland (GFCQ)
- industry associations, including the Queensland Resources Council (QRC) and the Australian Petroleum Production and Exploration Association (APPEA)
- representatives from coal seam gas companies and joint ventures operating in Queensland.

We made a conscious decision not to meet with local landholders and community groups. These groups have done extensive consultation with gas companies, governments, and with social science researchers, and there was considered to be a very real risk of research fatigue. Instead, the review has relied on the perspectives of the GasFields Commission and the researchers who have been working very closely with these communities.

This review is limited to the upstream and midstream stages of CSG development, as shown in Figure 1.2. It is often difficult to separate the economic impacts of construction of LNG export facilities from the impact of the upstream CSG development, and to separate the impacts from the various components of the CSG value chain within the upstream stages. Much of the literature does not separate these impacts, and LNG construction activities are incorporated into this study where that is possible.

1 Hunter and Taylor (2013)

- This Australian Federal Government report is heavy bias towards extracting results from research papers that could only be considered as a con-job, false and misleading. Such as the following example below from the research by Fleming & Measham, 2015, Local economic impacts of an unconventional energy boom[41]:
    - **(Snapshot from Report, page 31):**

[41] Fleming, D., Measham, T., "Local economic impacts of an unconventional energy boom: the coal seam gas industry in Australia." Australian Journal of Agricultural and Resource Economics 59.1 (2015): 78-94.

	The growth of the CSG industry in Queensland has led to increases in the number of high income residents in CSG regions.[58] Fleming and Measham's investigation of economic outcomes related to the CSG industry across southern Queensland found that between 2001 and 2011, areas with CSG development showed higher income growth than those without. Over this period, family income grew by 12 to 15 per cent more in areas impacted by CSG than the rest of Queensland.[59] Analysis of business income in certain towns showed a five-fold increase in one year.[60] o However, one only need to cross-check this paper to unveil the truth, extracts from the same referenced research paper provides the following truth: ▪ Therefore, in the case of personal income, *results may overestimate the CSG boom income effect at the local level*, as mining workers residing temporarily in CSG areas may pull the median upward. *Several studies have considered this issue, whereby local residents are potentially excluded from income benefits due to the high number of non-resident workers who take their income back to their normal place of residence* (Rolfe et al. 2007; Measham et al. 2013). (page 90) ▪ However, income effects are also significant for families residing in the region. This is an important consideration, given that the family income indicator does not consider families with members residing outside of the household surveyed (OESR 2012) so the associated income effect from the CSG development is indeed showing higher growth for families residing locally. (page 90-91) ▪ One interesting point in the income effect results is that the effect is higher in magnitude in sample 1 (for both personal and family incomes), which can be explained by higher income increases in the Bowen basin SLAs. Considering that the Bowen basin ***hosts other types of mining on a substantial scale***, especially compared to the ***relative lack of mining in the Surat basin*** (Table 1), this last effect could be the result of expansions of other mining activities in the area that can be ***increasing income beyond the CSG effect***. (page 91) ▪ In the average SLA ***hosting*** the CSG industry, family income grew by 12–15 per cent more than in comparable areas of Queensland during the decade 2001–2011. (page 92). • Key word, is 'hosting'. The data related to the research into family income, is not specifically related to CSG only, but to other mining sectors. • All aspects of people's livelihood changes when the quality of air, water, adverse health, inability to find workers, housing crisis, local council rate increases, increased traffic on roads, living expenses increases just to name a few.
Long term benefits	• Suggestion to the Panel to also consider the long-term adverse impacts to obtain a true and balanced view, and hence a NET understanding of the 'outcome' for the community • The long-term impacts are currently unfolding themselves in Queensland, as local communities are realising that their communities will never be the same again, and very little benefit has been obtained.
Community cohesion	• The gas industry deliberately works to divide the community. This is achieved by buying their way into town communities through donations to local groups (junior football clubs, schools etc.), while the rural landholders are personally impacted as their homes are changed from peace and quiet, to an industrialised landscape • The gas companies pick off the 'low lying fruit', first. These are the landholders who are easy targets and this sets about a domino effect that turns landholders against each other, this includes lifelong friendships where a farmer would help out another farmer. However, once a farmer agrees to wells this splits neighbours and the cohesion within a community **Key points from article** (2015): https://www.dalbyherald.com.au/news/moteliers-speak-out-about-fifos/2723976/ • WESTERN Downs moteliers had the chance to explain the devastating impact of oil and gas camps on their business, as the state government fly-in, fly-out inquiry held a public hearing in Dalby • Ms Grieve said occupancy was down 91% in the last 12 months but the problem was the industry was putting its remaining workers in camps not housing them in town motels • Queensland Parliament introduced laws to ban large mining companies from using 100% fly-in-fly-out (FIFO) workers • A number of councils in mining districts have lobbied governments for years to change laws - citing the damage the FIFO practice caused in some towns

	Queensland Government – Parliamentary Inquiry into FIFO and other long distance commuting work practices in regional Queensland: http://statedevelopment.qld.gov.au/industry-development/fifo.html • Parliament's Infrastructure Planning and Natural Resources Committee tabled their report into FIFO and other long distance commuting work practices in regional Queensland on 9 October 2015. The Queensland Government provided its response to the parliamentary inquiry on 17 March 2016 • The government's response detailed a range of measures to be adopted, including: o improved social impact assessments by mining companies o workforce plans that maximise the opportunity for local workers to get jobs o workers to live in local existing housing, or in purpose-built villages, where there is community support o accommodation that provides a safe, clean and healthy environment for workers. • Consultation is currently occurring with key stakeholders on a policy and legislative framework to implement the government's response **Key points from article:** Lessons CSG Operators can learn from Southern Queensland Towns http://gastoday.com.au/news/lessons_csg_operators_can_learn_from_southern_queensland_towns/91959 • One interviewee lamented how "nine out of ten people you see on the street are strangers". In a small country town with traditionally strong social cohesion, the presence of "strangers", mostly men, was described by local residents as being "disturbing"
Crime	 **Key points from article** (2015)**:** https://www.chinchillanews.com.au/news/crime-spike-keeping-police-on-their-toes/2875449/ • According to online Queensland Police Service statistics, assaults and breaches of domestic violence orders have more than doubled, while unlawful entry offences have more than tripled and shoplifting offences have quadrupled over the year to November, when compared with the previous 12 months • Assaults are up 160% with 39 offences recorded, compared with just 15 last year • Domestic violence order breaches are up nearly 120%. Public nuisance offences have risen 127%, up from 37 charges last year. Home break-ins have increased by 276%. Property damage offences are up nearly 40%, and shoplifting has more than quadrupled • Drug offences have also risen 28%, with 173 charges laid this year, up from 135 • Speaking anecdotally, Officer in Charge of Chinchilla Police Station Sergeant Gerard Brady said that since the end of the gas industry's construction phase in December last year, there had been an increase in reported crime within town • "We're certainly seeing a change in the social fabric and demographic within town," Sgt Brady said
Employment	**Key points from Research Journal Article**: *Local economic impacts of an unconventional energy boom: the coal seam gas industry in Australia*, Australian Journal of Agricultural and Resource Economics[42] • The CSG development in the Surat basin area has not produced gains in terms of employment in non-mining sectors, compared to similar regions of Queensland • Since on average (over the sample) there were 1.7 construction jobs for each mining job in 2001, the estimated elasticity implies that for each additional CSG job in a given SLA, 1.4 jobs are created in the construction sector in the same SLA. In the case of professional services, there were only 0.6 jobs in this sector for each mining job in 2001, which translates that for each new CSG job in an SLA, 0.4 new professional services jobs were created in the SLA. Elasticities for retail trade, hospitality and other services are statistically indistinguishable from zero • Considering that, on average, there were 5.7 agricultural jobs per each mining job in 2001, the negative estimated elasticity implies that for each additional CSG job in a given SLA, around 1.8 jobs were lost in the agriculture sector in the same SLA

[42] Fleming, D., Measham, T., "Local economic impacts of an unconventional energy boom: the coal seam gas industry in Australia." Australian Journal of Agricultural and Resource Economics 59.1 (2015): 78-94.

	• In the average SLA ***hosting*** the CSG industry, family income grew by 12–15% more than in comparable areas of Queensland during the decade 2001–2011. Employment in the mining sector has also grown faster across the CSG region. However, local job multipliers into other *non-mining areas are less consistent across space*. Looking in detail at the Surat basin, where most CSG wells have been placed, results suggest that *only positive job spillovers from the CSG industry to the construction and professional services sectors have occurred*, while the agricultural sector has seen a reduction in jobs. (page 92). o The question that now must be asked, is this positive spillovers to the construction and professional services sectors long-term for the region? Highly unlikely o Note, as explained above section, the 12-15% increase in family income is not due to the CSG industry solely
Business	**Key points from article** (2015)**:** http://www.thegreynomads.com.au/van-park-owner-begs-grey-nomads-to-end-boycott/ • The owner of the Columboola Country – halfway between Chinchilla and Miles – turned to Facebook to express his frustration at the convoys of caravans and motorhomes that bypassed his bush style retreat. He said that mining and gas had destroyed this area and the tourism had just about gone • In the past year, Columboola Country – which is set on 265 acres and has a creek running through the middle of it – has seen just 20 caravans arrive, a stark contrast to 2003 • "When I first bought the place, we averaged three vans every night," Mr Jackson told the Chinchilla News. "But you sit on the highway and watch the vans go past. It's not a lack of travellers that's the problem … it's the lack of stopping them." • David Hinds, co-owner of Possum Park north of Miles, said his business had maintained a loyal customer base throughout the CSG boom, but agreed there had been a 'backlash against mining towns from travellers' • "Word seemed to get around that CSG workers had taken over the accommodation," he said. "They might start to come back now though." **Key points from article** (2015)**:** http://www.abc.net.au/news/2015-06-27/coal-seam-gas-construction-boom-ends-in-qld/6575922 • Local businesses in the region said they could not have prepared for how quickly the construction boom ended • Dalby pub owner Di Reilly said business was so bad in town since the workers in fluoro left she was forced to close the public bar of the pub. "From the peak, [trade] could've dropped 75 per cent, compared to last year it's dropped another 50," she said. "It's gut-wrenching, it really is. It's very upsetting." **Key points from article:** Lessons CSG Operators can learn from Southern Queensland Towns http://gastoday.com.au/news/lessons_csg_operators_can_learn_from_southern_queensland_towns/91959 • Indirect, and often two-pronged, impacts of Darling Downs' CSG developments on social structures, culture and wellbeing were noted. For example, the influx of non-resident workers as part of the CSG construction phase was a boom for those providing temporary accommodation and housing. Motel rooms were booked out year-round with few vacancies available for tourists. Conversely, tourism-based enterprises reportedly suffered as a result **Business owner comments to Helen Bender over Easter Weekend (2017):** • "…the gas industry has f@cked this town…they (gas workers) don't buy from local businesses…" **Response to APPEA Submission:** • Reference to INPEX's Ichthys liquefied natural gas project, recent and pass job losses should be questioned to the adverse impacts to other businesses? http://www.abc.net.au/news/2017-03-16/inpex-job-losses-whats-going-on/8360370
Amenity	• The below pictures are just one simple comparison of how the amenity is removed by the unconventional gas industry • Science is not required in this case, as common sense can ascertain the adverse impact to residents that are forced to live near/in a gasfield. • Noise, light, air, water pollution is just the beginning. (Health impacts dealt with in another section of this submission) • Again, I personally invite the Panel to visit Queensland gasfields and witness the amenity loss. (That is if the industry will be honest, open and transparent to allow the Panel to see a fully operational gasfield, with Compressor Stations flaring, water pipelines operations, gasfields venting/flaring, drilling , traffic so that the Panel can obtain a full appreciation of the truth

Photo 1: Gas Flares, the intensity of the flare turns a night sky red, and stars are not visible (John Jenkyn)

Photo 2: Milky Way

Cumulative Risks

Key points from article: Lessons CSG Operators can learn from Southern Queensland Towns
http://gastoday.com.au/news/lessons_csg_operators_can_learn_from_southern_queensland_towns/91959

- An influx of non-resident workers in fluorescent work gear has changed the look and character of some towns. Also affecting the character of certain towns is an outward migration of older residents who took the opportunity to sell their house for a good price. As a result, there are reports that towns are losing their volunteering resources and their informal childcare providers
- The pace and scale of development experienced in the Downs is unprecedented for an Australian regional area. Rapid change can often lead to social instability, a reduction of community cohesiveness, and perceptions that individual and community wellbeing are in decline. Evidence of these changes suggests that the social evolution of the region has presented challenges, though the financial injection from CSG development seems positive
- Having inadequate social services can make an area less attractive to live and invest in, which can generate a downward spiral as residents leave and the local skills base gets depleted

	• Traffic was the most common complaint received by the CSG companies' community engagement staff. One long-term resident in Dalby noted how this commuting was a reversal of the traditional trend, where people living in the smaller towns would travel to Dalby for work opportunities. • Currently, gas operators report the expected, and measured, socio-economic impacts of their activities mainly at the regional level only. *More reporting at the town scale is called for*. The companies seem to affiliate themselves with specific towns, usually the ones closest to their gas field leases. A positive impact in such towns enables the gas operators to forge a 'social license to operate', in part through local community investment and local procurement of goods and services (as discussed above, gas companies buy a 'social license', splitting the community cohesion • Question: would the gas companies obtain a 'social license' on their own right, without pulling out a cheque book? **Response to APPEA Submission:** • The response to APPEA's confusion as to why this inquiry has been called, is due to that the gas industry having no social licence to commence their activities in the Northern Territory (across many areas of this Country)

Economic Impacts

the gas industry just doesn't add up...

It will be considered unconsiousable conduct if the Northern Territory government (and or this Panel) did not undertake a real honesty economic cost-benefit analysis on the shale gas industry. The risk is too high to proceed without an analysis.

This analysis must be allowed to be reviewed by the community prior to finalisation.

Value	Comment and Feedback

Distribution	**Queensland is promoted by Industry and politicians as being the Smart State for opening up the State to gas extractions – however is this really the case?** (2016): https://newmatilda.com/2016/06/17/the-big-coal-con-car-registration-in-queensland-brings-in-more-revenue-than-coal/
	• Queensland's large-scale gas exports began in 2014, and Queensland Treasury had predicted that they'd be pulling in over $660 million of royalties in the next year. It looks like they'll get one tenth of that, $68 million in 2016-17, with the forecasters predicting $270 million in 2019-20. (The future will only confirm how bad this gas industry really is when it comes to paying royalties)
	• Those figures are royalties. It's not how much the gas is actually worth
	• Royalties are the money paid to Queenslanders by gas companies for the right to dig up and sell off the gas that belongs to Queenslanders. Gas under the ground is collectively owned by the people of Queensland. We only get to sell it once, so we should be trying to get the best price possible
	• The sale price the gas companies get for Queenslanders' gas is much higher. Treasury expect annual gas exports to be worth over $20 billion each year by 2017-18
	• So that's $20 billion worth of gas soon to be leaving Queensland each year (page 41), but Queenslanders will struggle to get more than $200 million per year for it (page 241) [Note: This would be just enough money to build a small hospital to treat the sick residents from the gasfields – is it worth it?]
	• The gas companies do invest in infrastructure, process and market the gas, so clearly they do need to get a higher price than they pay to Queenslanders in royalties. But according to Queensland's own ever-optimistic Treasury, it looks like Queenslanders will be receiving about 1 per cent of the export value of their gas in royalties
	• What's worse, for these paltry returns Queenslanders have to put up with significant damage to their environment. Gas operations have impacts on water and air quality and on other industries
	• Somehow, the budget papers put a positive spin on Queensland's gas exports:
	  ○ [A] rebound in GSP growth is underpinned by a surge in overseas exports, as liquefied natural gas (LNG) production ramps up and drives the value of Queensland exports to almost $100 billion by the end of the decade. (page 25)
	• Earth to Treasury: surges in exports and GSP based on gas aren't much good unless you're taxing them properly, and/or you own the company. Neither is happening in Queensland, where most gas companies are foreign-owned and the wider problems of taxation of the gas industry are too big for this column [or submission]
	• To put it bluntly, Queensland is not getting a good return for its natural resources
	
	Real returns from Gorgon project likely to be half official projections (2016)**:** http://www.smh.com.au/business/mining-and-resources/real-returns-from-gorgon-project-likely-to-be-half-official-projections-20160327-gnrun6.html
	• Just before the first Gorgon shipment departed, federal Resources Minister Josh Frydenberg said: "Federal taxation revenue derived from the Gorgon project alone is estimated by ACIL Allen Consulting to total nearly $70 billion by 2040, and the project is expected to contribute more than $440 billion to national GDP."
	  ○ Real returns from Gorgon are likely to be less than half that. The ACIL Allen report on which oil major Chevron, the operator of the Gorgon project, bases its claims, seems to have become accepted wisdom. Yet its assumptions are old, overly optimistic and ought to be questioned.
	• The report first saw the light of day when Chevron executives came before a Senate inquiry into corporate tax avoidance in 2015. Chevron Australia managing director Roy Krzywosinski told the Senate Gorgon and Wheatstone projects between 2009 and 2040 would:
	  ○ Deliver more than $1 trillion to Australia's gross domestic product
	  ○ Create nearly 150,000 full-time-equivalent jobs in Australia

	○ Contribute more than $338 billion in federal government revenue • Massive numbers, though numbers most unlikely to stack up. For a start, Chevron's oil price *assumptions* are ***$US70-75 a barrel, not $US40***, where they stand now, and because the ***price of gas is linked to oil***, and there is a global gas glut, the forecast benefits would appear to be exaggerated. • It is true that few foresaw the dramatic slump in the price of oil. Still, expectations of taxes and royalties ($338 billion in revenue) are ebullient, even at $US70 a barrel. • Chevron has said it has paid more than $3 billion in Australian taxes over the past five years. However, its annual filings to the Australian Securities and Investments Commission over that period (2010-2014) show that $677 million was paid in Australian corporate tax, equating to an effective tax rate of just 7%. • We do know, from ***Australian Taxation Office data disclosed in December, that in 2013-14 zero was paid in PRRT royalties***. And given the PRRT tax credits amassed from Gorgon and Wheatstone investments, it is fairly safe to conclude that PRRT was not paid in the earlier years. • A Fairfax investigation in 2015 found the PRRT delivered $1.2 billion to government coffers in 2003-04 but is destined to raise just $1.4 billion when the industry reaches peak production in about 2019. This was confirmed by the Australian Taxation Office. • Goldman Sachs chief economist Tim Toohey earlier estimated the resources rent tax would deliver "***no additional PRRT revenues over the coming decade***" at least. • Then there is tax. Given the $35 billion in related party loans from Chevron's US parent, and its Byzantine transfer pricing arrangements, it would be strange to conclude the oil major would be tipping in more than pocket fluff in corporate income tax in the course of the next decade **DISCUSSIONS:** • How does the NT Government ensure that the Territory receives any revenue from the shale gas industry, when the companies are doing everything in their means to avoid paying royalties and taxes?
Property Values	**Coal seam gas mining costs farmers millions, CSIRO study finds** (2016): http://www.abc.net.au/news/2016-12-16/coal-seam-gas-mining-costs-farmers-millions-csiro-study-finds/8124834 • According to the model used by the CSIRO, a sample area averaged a loss of $2.17 million over 20 years when CSG mining activity was present. • "Coal seam gas mining is a multi-faceted research area, and it requires critical research as it is a new, rapidly expanding industry," Dr Marinoni said. (Note: how will the Shale Gas Industry be any different in the NT?) • "This model does not assess the impact to groundwater, greenhouse gas emissions, or socioeconomic impacts," (Note: Will the Panel consider these and other impacts within their economic assessment of the Shale Gas Industry?) **Narrabri warned of coal seam gas impact on house value by Chinchilla** (2017)**:** http://www.northerndailyleader.com.au/story/4562970/what-does-the-csg-industry-do-to-the-price-of-nearby-houses/ • QUEENSLAND residents have described the coal seam gas industry's impact on local housing prices as "a really short party with the worst and longest hangover" • They're warning Narrabri residents to be prepared for a sudden and rapid rise, followed by a sharp and steady decline in the value of their home if Santos' 850-well project is approved. • When the CSG industry came to town, the value of her unimproved land tripled in three years, before dropping more than $20,000 below its original value. • "My unimproved land was worth $58,000 prior to the boom – between 2011 and 2014, when the CSG party was in town, it rose to a whopping $182,500 and my rates increased by almost 100 per cent," Ms Auty said. • "Every year since that peak the value of my land has dropped but rates have continued to rise. I just got a valuation notice this month and it's dropped to $35,000. **Commonwealth Bank: coal seam gas makes property 'unacceptable' as loan security** (2016)**:** https://www.theguardian.com/environment/2016/sep/30/commonwealth-bank-coal-seam-gas-makes-property-unacceptable-as-loan-security • Bank turns down owners' application for $500,000 bridging loan on grounds that Queensland property has four coal seam gas wells on it. • The application "fails to meet the bank's lending criteria" because the Chinchilla property was "unacceptable" as security, despite being wholly owned by a couple with no outstanding debts or credit blemishes and a primary income reaching well past the top tax bracket.

	• "Long form valuation has revealed coal seam gas wells on the land, making the security unacceptable for residential lending purposes," the bank said. • The owners then asked QGC if they would buy the property, but the company refused. • Mark McGovern, a rural economics specialist from the Queensland University of Technology's school of business, economics and finance, said the case *could signal a wider unforeseen economic cost of the gas industry*. • If the bank regarded property with gas wells as unsuitable security for a bridging loan, it followed it would not lend to people to buy such a property, McGovern said. • "Someone buying in as a resident wouldn't meet the criteria of the Commonwealth bank," he said. • The property owner, who asked to remain anonymous, said he and his wife had become "sort of prisoners in our own home". • "We can't sell it, we can't lend against it. It's useless to us," he said. • His wife said she was "ropeable" on learning of the loan rejection after QGC had given public assurances its activities would not affect property values. **Property market undecided on the value of coal sea gas wells on farms** (2014)**:** http://www.abc.net.au/news/2014-01-20/csg-land-values/5206022 • "At this time, whilst there is little disclosure of CSG development and impact on rural properties, there's no evidence that the rural property investor market is prepared to pay any premium for gas income," he said. **Study on the impact of the Coal Seam Gas industry on land values in NSW Report for: NSW Valuer General** **February 2014 Prepared by Land and Property Information** http://www.valuergeneral.nsw.gov.au/about_us/announcements?a=197003 • the limited market evidence available for this study indicated no clear impact of the CSG industry on land values in NSW. However, a major limitation of these findings is the low number of sales that are available to analyse. The co-existence and impact of mining activity also limited the ability of the study to investigate some locations with CSG developments. It is also acknowledged that values of rural and rural residential properties are impacted by a variety of factors and comparisons made from one property to another can be subjective. • Anecdotal evidence indicated that the presence of the CSG industry in an area may potentially cause a reduction to the number of potential purchasers and an increase to the time taken to sell a property. Some people dislike the industry and consider that it leads to the industrialisation of an area with the further potential for contamination and health risks. These perceptions can lead to a stigma developing in an area. This was considered to be most prominent in rural lifestyle areas where a high proportion of a property's value is attributed to the scenic and rural amenity of the area. **DISCUSSIONS:** • What is the evidence that the shale gas industry will be any different to CSG industry on property values in the Northern Territory? • If a landholder considers there to be any negative risk to the value of their property, an outcome that the industry cannot control due to the property market being determined by purchasers (unless the companies purchase all the land required for shale gas mining)
Other industries	**Agriculture – anecdotal comments from landholders:** • Cattle farmers have been impacted due to the amount of dust on their paddocks, resulting in the cattle not eating the available feed on the property • Cattle farmers have been impacted with lost cattle from fences being cut, gates being left open, and cattle falling into pipeline trenches • Cattle lost due to the companies leaving plastic tape in the paddocks, of which the cattle eat and die from. Queensland landholders invoice gas companies for the loss of stock however the cruelty on the cattle dying a painful death with plastic tape caught in their stomach • Land area lost results in a reduction of productive availability for the agricultural industry, i.e. less head of cattle on land than originally able to **The economic impacts of Australia's mining expansion: Quick links to TAI research:** http://www.tai.org.au/node/1945 The Australia Institute (TAI) has been researching the economic impacts of mining activity in Australia. This document provides a brief summary of key facts and links to TAI research papers, policy briefs and submissions currently available online.

Key facts

1. **Mining 'crowds out' other industries:** The expansion of mining causes a contraction in non-mining industries, particularly manufacturing, tourism, agriculture and education. This results in business closures and job losses.
2. **Mining is a small employer:** Mining is highly mechanised and employs few people relative to other industries. It employs only around 2% of the Australian workforce.
3. **Mining is a poor taxpayer:** The effective corporate tax rate for mining is 13.9%, well below the industry average of 21%.
4. **Mining is highly subsidised:** Every year the Commonwealth Government subsidises the mining industry by at least $4 billion dollars.
5. **Mining is 83% foreign owned.**
6. **Mining did not 'save' Australia from the GFC:** Mining shed 15% of its employees within 6 months of the GFC. If the rest of the economy had behaved the same way, Australia would have experienced 19% unemployment.

From the above link, it would appear that both the manufacturing and agricultural industries suffer the most due to mining.

- The proposed Arrow Energy LNG project in QLD will have result in job losses across QLD and Australia, and a range of other negative economic impacts.
    - The company's own Environmental Impact Statement acknowledges it will result in;
        - The loss of 1,600 jobs; 1,000 in manufacturing
        - The loss of $441.5 million in manufacturing activity.
- There is virtually no evidence that the proposed Browse LNG development at James Price Point will have any economic benefits.
    - It will result in around 3,000 job losses across WA, especially threatening local tourism.
    - It will rely on up to 97% fly-in fly-out (FIFO) workers, employing few locals.
- Santos' modelling shows minimal benefits to the local economy, with major benefits accruing to Santos owners.
    - The modelling, by Allen Consulting Group, raises more questions than it answers, suggesting only 30 new gas jobs, but 570 new public sector jobs will be created.
- Mining activity 'crowds out' other sectors of the economy, especially agriculture, tourism, education and manufacturing.
- The current rush to approve mining projects is damaging other industries.
- Queensland's non-mining sectors are under pressure from a high AUD and skills shortages, driven by the mining boom.
- Proposed mining projects in Queensland could destroy almost 20,000 jobs across Queensland and Australia, mostly in manufacturing.
- Since the mining boom started, Australia's rural sector has lost $43.5 billion in export income due to the high AUD, which is being driven up by the mining boom.
- In 2010-11 alone, the beef industry lost $2 billion in export income and the sugar industry lost $566 million.
- Updated analysis from Beating around the Bush shows rural sector losses of $61.5 billion in export income due to the high AUD, being driven up by the mining boom.
- Over the nine years of the boom:
    - Cotton growers have lost $2.5 billion
    - Wheat growers have lost $8.3 billion
    - The beef/veal industry has lost $8.5 billion
    - The sugar industry has lost $2.7 billion.
- According to Waratah Coal's own Economic Impact Statement the mine will cause:
    - The loss of 3000 jobs across Australia
    - The loss of $1,249 million of manufacturing activity

DISCUSSIONS:

- The above key points highlight the urgent requirement for the NT Government to undertake serious research into the real possible impacts that the shale gas industry will have on other industries. Accurately identify the industries, how the industry will be impacted, the economic impact, and the potential time for recovery.
- The gas mining industry has a no defined footprint; hence impacts are a certainty and it is the responsibility of the government to fulfil their code of conduct and duty of care
- Additional cost of health services – directly and indirectly (introduction of toxins into the food supply from crops and animals exposed), and the economic effects of the deaths of animals (cattle producers), and the loss of reproductive capacity (high stillbirths)

Energy security	**Gas Crisis or Glut?** (2017)**:** http://theconversation.com/gas-crisis-or-glut-why-japan-pays-less-for-australian-lng-than-australians-do-74438 • There is no market though, only a cartel of six big players who control the price: Santos, Exxon, BHP, Origin, Arrow Energy and Shell. Markets have visible prices and quantities on the bid and offer. The cartel even hides information about its gas reserves from government. • Japan, which is comfortably the world's largest importer of gas at 34% of the global market, showed a 2% drop in imports last year just as the three LNG plants in Gladstone, Queensland, were ramping up production. (Why would NT add to the glut in gas?) **Experts warn investing in gas will hike up prices more** (2017)**:** https://www.gladstoneobserver.com.au/news/experts-warn-investing-in-gas-will-hike-up-prices-/3168973/ • A LEADING climate institute has warned against new investment in gas, claiming it would further drive up prices. • The Climate Council's Pollution and Price: The cost of investing in gas report released yesterday largely blamed international LNG exports for driving up domestic gas prices. • "Australians need to know that more gas doesn't mean cheaper power. If our government places more reliance on gas power instead of renewables in the domestic market all it will do is drive up electricity bills more," he said. • The report spruiked renewable energy as a cheaper form of power generation compared to gas. **DISCUSSIONS:** • Energy security will come from renewable energy – if Australia does not move to renewable energy now, we will have both an energy and environmental crisis on our hands
Net Impacts	• In May 2011, the Premier of Qld announced that the CSG Industry would "Over the next 25 years, the project will contribute over $6 billion to State revenue, generate $9 billion a year in exports and see the creation of 6,000 jobs," Ms Bligh said.[43] ***Here are some facts about the Queensland Government estimates:*** In *2015* (only 4 years after the above statement): http://www.couriermail.com.au/business/queensland-government-slashes-lng-royalties-revenue-forecasts/news-story/4690b2421a01c9ba2ee36555883734d4 o The emerging LNG industry will deliver just $129 million in royalties this financial year compared to last year's forecast of $561 million. o the Government was tipping petroleum royalties would reach $636 million in 2017-18 but that has now been shaved to $467 million. o The best Queensland is hoping for now is a royalty return of $518 million in 2018-19 despite early forecasts under the Bligh government of more than $900 million **LNG, coal royalties set to pour millions into Queensland Government coffers** (2013)**:** http://www.couriermail.com.au/news/queensland/lng-coal-royalties-set-to-pour-millions-into-queensland-government-coffers/news-story/5e445c4c8eb9838f793c59d982026900 • THE LNG industry will start *pouring hundreds of millions of dollars into Government coffers by 2015* (note above on the 2015 actuals), but could have an impact on the state's efforts to fight global warming. • According to Budget documents, the booming LNG industry is expected to increase demand for baseload power generation and also move the domestic price of gas towards international prices. • Treasury also said the blowout in the construction costs of the LNG plants on Curtis Island off Gladstone would reduce the amount of royalties received by the Government. This was because the royalty is determined at the price received by the gas companies with deductions for the investment made. • Treasury estimated that royalties from sectors other than coal will start climbing from the 2013-14 financial year to $479 million. *By 2016-17, those royalties would grow to $924 million*, more than double the current level and largely on the back of LNG. **Australia is missing out on tax revenue from gas projects** (2016)**:** http://theconversation.com/australia-is-missing-out-on-tax-revenue-from-gas-projects-62899

[43] Premier and Minister for Reconstruction, The Honourable Anna Bligh "Premier Heralds New 'Gas Age for Queensland" (27 May 2011). http://www.cabinet.qld.gov.au/mms/StatementDisplaySingle.aspx?id=74946

	• The low petroleum resource rent tax collection suggests there are marginal benefits from the current LNG boom for the wider community, as Commonwealth taxes are collected and redistributed Australia-wide. • The Australian Tax Office statistics below reveal that in 2014-15, out of 149 returns, only eight "profitable projects" are currently paying petroleum resource rent tax. It's not likely this will improve in the future due generous tax concessions. • Chevron (a major an oil and gas company) failed to defend its profit-shifting, which minimises company tax, in the Australian courts. The loss has sent a message to industry about observing the intent of tax laws. • Surely this lack of revenue from the petroleum resource rent tax raises a few questions for the government? There has been recent commentary about a resource rent tax versus a royalty. It's time for a review of the taxing of LNG projects. **Response to APPEA Submission:** • Are APPEA suggesting that the NT gas will only be for the domestic market? Is this their position that no gas is exported, or transferred across the Territory boundary? • NT's real economic challenge is to consider the long-term economic impacts associated with the gas industry, and the potential adverse impacts to all other industries. An honest assessment of the negative impacts to all other industries, environment and health **DISCUSSIONS:** • The CSG-LNG project in Queensland has never undertaken a thorough cost-benefit analysis of the industry. The total cost of impacts has been neither quantified nor justified. Will the Northern Territory government follow the same unconscionable conduct?
Management	If the Australian Gas market is linked to the Oil Market, research into the oil market is required by the Panel – it would only make sense. **The Boom-Bust Cycle - Five Stages of the Oil Industry** http://www.financialsense.com/contributors/robert-rapier/boom-bust-five-stages-oil *The Boom-Bust Cycle for Dummies* • First it's important to understand that the oil industry is cyclical, and more importantly to understand the reason that it is cyclical. The long history of the oil industry has been one of boom and bust cycles. During the booms we hear about windfall profits, but during the downward part of the cycle, oil companies lose a lot of money and many people lose their jobs. • So why is the oil industry cyclical? It's not complex. It is a function of the capital-intensity of the business, and the multi-year lag time in getting projects executed. If you just want the executive summary, here it is. I have arbitrarily started this at the bottom of the cycle, and the 5 stages I have described here could be described at a more granular level with more stages: o Stage 1: At the bottom of the cycle, there is excess oil supply which results in low oil prices and a period of under-investment by the oil industry. Low prices also stimulate higher demand. o Stage 2: Demand grows faster than supply, leading to a tightening supply/demand balance. Oil prices begin to rise. o Stage 3: Rising oil prices mean oil companies start making money, and they ramp up investments in new projects. The higher prices rise and the longer they remain high, the greater the investments. New oil plays become economical, and new oil companies are formed. Some of these companies employ a lot of financial leverage, which is OK until… o Stage 4: Higher prices curb demand growth, and new projects begin to come online. Production growth begins to outstrip demand growth. o Stage 5: Prices collapse, and the oil industry contracts as capital expenditures are slashed. We return to Stage 1. The cycle is complete. • While there is broad agreement that a great deal of U.S. oil production is currently unprofitable, some feel like oil prices need to fall further to make a bigger dent in production because crude oil inventories are still quite high. I feel like with the continued growth in global demand, we can already see the supply/demand picture tightening on the horizon. When that becomes broadly obvious, oil

	prices will again rise, bringing profits to the industry and higher capital spending on new projects. How long that process takes will determine how many oil companies are left standing to reap those profits. **DISCUSSIONS:** • No amount of management can stop the inevitable of a resource boom or bust. The best management would not to commence the cycle to begin with. • Will the boom and bust of the gas industry follow the boom and bust of the oil industry? The correct answer is yes?
Cumulative Risks	**Qld CSG emissions damage bill to cost an eyewatering $23 billion a year** (2015)**:** https://independentaustralia.net/environment/environment-display/qld-csg-emissions-damage-bill-to-cost-an-eyewatering-23-billion-a-year,8353 • It begins with a report from the Climate and Health Alliance (CAHA), which gave the reported costs of the damage from CO2 emissions. o CAHA reports: ▪ 'Evaluations of the social costs of carbon are highly variable and range from $37/tonne of carbon dioxide emitted to $190/tonne.' [Values in US dollars] ▪ Social costs of carbon are related by CAHA as: ▪ These damages include health and property damage, impacts on agriculture, damage to ecosystem services, and other welfare costs associated with climate change. ▪ The method of establishing this cost is known as the 'social cost of carbon' — essentially a monetized estimate of the damages caused by emitting an additional tonne of carbon dioxide in one year. ▪ Estimates of the social costs of carbon vary widely. o A new study published in Nature Climate Change, and reported by standford.edu reports a new figure of US$220 (A$309) a ton, or US$240 (A$344) a metric tonne. So that calculates out to a projected social cost of A$23 billion of damage done by Queensland's gas a year at full production of 25 million tonnes. o The on-ground destruction of Queensland by CSG is slated to last thirty years, so if that holds true, by the time the industry winds down, emissions from CSG/LNG in Queensland will have racked up **A$690 billion worth of damage**. o If the price stays in this band, and most conjecture is that it will, then income from Queensland's LNG will be in the A$15-20 billion per annum. Royalties from CSG in Queensland run at around 10 per cent, thus yearly income from CSG to the Queensland taxpayer will be A$1.5-2 billion. o After thirty years, CSG will have earned A$45-60 billion for Queensland. o But, meanwhile, the burning of this gas will have wreaked A$600+ billion of damage to the Earth and we, the people, thereon. You don't have to be a math whiz to see how appalling that would be. o ***What will be the real cost to the Northern Territory?*** • While offering economic and perceived 'energy security benefits', shale gas mining presents considerable environmental risks – Certainty must be applied to the potential cost irreversible harm being done to the environment (as described within this submission) • What is the long-term costs to store the huge volumes of solid waste (potentially radioactive) • Should any industry savings on methods of extraction, treatment, disposal be at the cost of public health or agricultural sustainability (ultimately)

Land Access

farmers do not want to be told how to do their job or what they can or cannot do with their land…the main concern of farmers is that gas drilling represents a landowner's rights issue

It is common cultural courtesy to knock on the front door and only then enter by invitation from the homeowner. Unless of course you are a gas company operating in Australia, in which case you'll gain access via cutting through the back fence to undertake mining activities without the consent from the landholder.

Value	Comment and Feedback

Consultation	**Example from Queensland Access to Land**
	• Petroleum legislation imposes a duty of care on the gas companies to ensure that they carry out their authorised activities in a way that "*does not unreasonably interfere with anyone else carrying out a lawful activity*"[44]
	• In reality, the mere presence of these gas projects on local land will cause disruptions to the landholder including as a result of the location of infrastructure on the land such as drill sites, well heads, gathering lines, compressor stations, fluid storage and treatment facilities and access roads. These in conjunction with noise impacts and impacts on visual amenity will affect practices on the land such as locations of stock, pasture and crops
	• In 2010, the Qld Government introduced a uniform *Land Access Code*, in an attempt to appease some of the community resistance to the resource sector
	  ○ The code is to balance the interests of the agricultural and resources sectors including through best practice guidelines for good relations and good faith between operators and the owners/occupiers
	  ○ Includes a number of mandatory conditions, however the gas companies still breach private land access codes
	
	Following are real examples of gas company's consultation style:
	QGC Consultation style (Note: Richard Cottee's was QGC's MD at this time, now MD for Central Petroleum)
	• Chairman of QGC, Robert Bryan visited a 'sod-turning' event in Chinchilla in 2005/6 and singled out George Bender to intentionally insult him with the following comment regarding the recent QGC Compensation offer, "…you (George) wouldn't make $265 (per year) off your property in a year of a drought…"
	• **23 November 2012**, Bender's received a LAND ACCESS NOTICE for the installation of Optic Fibre from Bentline Pty Ltd, who were contracted to do works for Torus Networks.
	  ○ Anticipated Commencement date of **13 December 2012**
	  ○ Works claimed to be under the *Telecommunications Act 1997* (Cth) and the *Telecommunications Code of Practice 1997*. There is limited rights to object under this Act and Code by a private landholder
	  ○ On 28 November 2012, Bender's contacted Bentline Pty Ltd and were advised that the end-customer was out of their scope and contact had to be made with Torus Networks. Bender's were informed that the works were part of the NBN roll-out, and after speaking with Telstra, Bender's were informed that there was no NBN fibre optics being installed.
	  ○ On 29 November 2012, Bender's objected to the telecommunication line being installed across their property based on:
	  ▪ Use/client for the fibre optic was for QGC
	  ▪ Using the land to engage in the activity
	  ▪ The location of activity across the land
	  ▪ The date proposed to start the activity
	  ○ 4 December 2012, Bentline advised that the reasons for objection was not valid and that Bentline would progress with activity
	  ○ Only from extensive individual investigations, it was uncovered that a private company such as QGC are not able to use the Telecommunications Act or Code of Practice for the installation of private telecommunication lines. QGC lied to deceive landholders to install associated infrastructure across private land
	  ○ On 7 January 2013, Bentline were authorised by Torus Network to withdraw the Land Access and Activity Notice sent. To date, no further notices have been re-issued to the Benders.

[44] Queensland Government, "Strategic Cropping Land Bill 2011: Explanatory Notes"

Origin Energy Consultation Style:

- Encourage The Panel to review the video of a landholders' experience with Origin Energy: https://www.facebook.com/GeorgeBender68/videos/1298158346967158/
- After the death of George Bender, Origin Energy advised the Bender family that Origin will no longer develop the property of "Chinta". However, on an email dated 9 March 2017, Origin attached a map of the pipeline pressure testing with a pipeline T-section pointing directly into "Chinta". Have Origin Energy lied again?
- Refer to Appendix F email dated 7th January 2014 from Shine Lawyers regarding correspondence from Origin Energy, "The general tone of the response [Origin Energy] indicates that they wish to "cut us [Shine Lawyers] out of the picture" and negotiate directly with you [George Bender] in relation to the make good measures"
    - Origin Energy made numerous attempts to avoid dealing through engaged solicitors, generating additional stress on George in an attempt to further intimidate the landholder during Make Good Agreement (MGA) negotiations; negotiations that were clearly not going in Origin's preferred or intended direction
- Refer to Appendix G email dated 20th November 2014 – Grant Higgs, Senior Landowner Relations Advisor Request for Access to Complete Scouting for the decommissioning of the bores on 29th November 2014, "It will Involve **up to 10 persons** (emphasis added) scouting the access tracks and areas surrounding the bores".
    - Origin failed to comply with agreed land access conditions. Details of this event are covered below:
        - Email 4th December 2014 from Origin Energy regarding the failed scout:
            - "…the failed scout itself have cost Origin considerably as well as having caused unnecessary delays and additional stress to yourselves"
            - "While you are understandably upset…"
            - "The decommissioning has been flagged at the highest level as being important and urgent"
        - George Bender's email dated 5th December 2014 – listing all issues that George had with Origin Energy dealings/negotiations/behaviour etc.
        - Refer to 'report' that cost Origin considerably, Appendix H: dated 2nd December 2014 – this is a copy of the report that cost Origin considerably and flagged at the highest level:
            - Of particular mention is the blatant LIE that the email dated 20th November 2014, "**only stated 10 people and 6 cars**" (emphasis added)
            - Origin Energy Chief Development Officer, Maia Schweizer advised Brian Bender that the report was not a credible report as it was authored by Grant Higgs (this is Origin's own people discrediting Origin)
- Origin Energy at **2:40pm, 17th December 2014** cancelled the meeting scheduled for 18th December 2014 to discuss the long list of issues and concerns that George had encountered with Origin Energy. (Origin instead emailed at 2:08pm on 17/12/14 with a list of responses to George's concerns, however avoided to meet with the landholder in person)
- At approximately **4:30pm, 17th December 2014** a telephone call was received by the Benders from a local real estate agent enquiring if 'Chinta' was for sale, as there was private interest in the property for $X million
    - George uncovered that the private interest was a neighbour to 'Chinta', Trevor McKay. McKay had already signed a CCA with Origin Energy, and also declared to George that 'Chinta' was now devalued due to the pending decommissioning of the water bores.
    - Why was the above important? Origin Energy made numerous verbal claims to George that they would always pay two (2) times the market value for a property. And when Origin Energy put their contract of sale to George in 2015, the offer was for 2x$X million – how could Origin Energy know what the private offer had been if they were not a part of this game? Why was the meeting cancelled on the same day as a private offer to purchase 'Chinta'? A freak coincidence it is not, it was a deliberate attempt to cheat, and disrespect George Bender out of a fair and reasonable negotiation period and to avoid the liabilities to Make Good – it is known that Trevor McKay was never the intended purchaser but that Origin Energy was the backer behind the 'private deal'
    - The Real Estate also made claims that Trevor McKay had sold his property at Charleville, hence was requiring to purchase immediately, however we have checked and confirmed that the property has never been sold. Another lie.

- Bender's requested for clarification from Origin Energy as to how they have not breached the MGA – Schedule 2 Special Conditions 5 & 6? Origin Energy were unable to respond until 17th January 2016. They never did respond adequately to this question of being in breach of the MGA.
- Origin Letter dated 6th March 2015 notifying the Bender's that there was a dispute in relation to the Agreement:
    - Dispute makes claims that Origin subsequently attempted to access 'Chinta' to undertake decommissioning activities but were not permitted entry
    - Bender's dispute the above claim, as no formal request or entry notice was provided to re-enter 'Chinta'. Bender's made continual requests for all previous issues to be adequately answered prior to Origin continuing with decommissioning activities – a task that Origin continued to avoid
    - First attempt from Origin for a meeting since cancelling the 18th December 2014 meeting, was on 31st March 2015 (this meeting was necessary due to the issued dispute notice, requiring both parties to use reasonable endeavours to resolve the dispute within 20 business days)
- It was agreed that the decommissioning activities would commence on 17th July 2015. The behaviour of Origin Energy during the period of April – July 2015 was:
    - Targeting George directly, to threaten, bully and intimidate him and forcing George to talk about Conduct and Compensation Agreement (CCA) and as we suspect, personal verbal attacks against George which he has taken to his grave. George's behaviour immediately after verbal communications with Mark Turner (Origin Energy – Manager Land Access Agreements) during this period was out of character
    - Origin Energy entered 'Chinta' to unjustly undertake 'scouting' for MGA, however again did not comply with the marked access tracks, hence it was a direct attempt to 'scout' for CCA purposes.
    - The above 'trespass' was then used against George to further intimidate and bully and harass George into selling 'Chinta' when Origin said the following to him:

      '…it would be safer for us and you if you sold to us…we will buy it (twice market value)…we can do what we want…ask your local member.' – verbal comments by Mark Turner, Origin Energy, July 2015

    - On 30th July 2015, Origin exited all activities to decommission the bores under the executed MGA and as required under the legislation, to proceeded with the force sale of 'Chinta' so that they could "do what they want", and obviously not bother decommissioning or making safe the water bores
- Note: there is no specific requirement to decommission a landholder's water bore under the legislation…there is a requirement to enter into a MGA, but no legislation to physically decommissioning of the bores needs to occur i.e. to undertake the activities agreed to within the MGA
- On Sunday 22nd November 2015, Bore RN 83627 kicked contaminated water due to the depressurisation of the Walloon Coal Measures (refer to Environmental issues on the issues surrounding the bore kicking contaminated water)

Response to APPEA Submission:

- A balance discussion can only be achieved once landholders and impacted individuals are provided with the same balanced rights as the industry i.e. water allocation, negotiation powers etc.

Examples of Landholders experience with Origin, Santos and other Gas Companies:

- Published in 2014: https://www.youtube.com/watch?v=NIEUfQlXGFc

Queensland Lawyers Perspective:
http://www.abc.net.au/news/2016-12-16/coal-seam-gas-mining-costs-farmers-millions-csiro-study-finds/8124834

- Shine Lawyers' Peter Shannon represents many landholders in CSG mining cases.
    - He said the standard Conduct and Compensation Agreement (CCA) between the CSG companies and farmers was a "classic commercial negotiation".
    - "In that negotiation, the mining companies are looking at what the court would do — that is, assessing the value of the land before and after the CSG mining," he said.
    - "It's a commercial code of conduct, there is no regulatory guidelines which the industry has to abide by."
    - "There is no clear code of conduct or provision, nor are they easily held to account in the negotiation context."
    - Mr Shannon said a farmer has no knowledge of what they are walking into when they are signing a Conduct and Compensation Agreement.

	○ "We can only deal with the short-term known impacts, that's one of the difficulties assessing compensation," he said. **DISCUSSIONS:** • How will the Northern Territory Government ensure that compensation will account for all impacts both short and long-term impacts? • How will the Northern Territory Government regulate the Code of Conduct by gas companies? Will there be a government representative involved in all correspondence and negotiations to ensure balance?
Consent	**Example from Queensland Conduct and Compensation Agreement (CCA)** • The legislation requires that a *Conduct and Compensation Agreement* (CCA) be negotiated between the gas company and the landholder, before the gas company may enter the land ○ The minimum negotiating period for a CCA is generally 20 business days • There have been four (4) known trespass by gas companies and/or their contractors on the Bender's property 'Chinta'. The question remains, how many times have trespass occurred without our knowledge? **DISCUSSIONS:** • Will the NT landholders be provided with the right to veto any gas company to access their property? • How will the government adequately penalise the gas companies from trespassing? • Gas companies have the attitude that they can enter property without the required and necessary permissions from the landholder, given that the properties in the NT are large, landholders will be placed in a highly stressful/anxious position that gas companies will enter without their knowledge. How will the government control this well-known behaviour of the industry?
Conditions	• CCA is hampered by the obligation of confidentiality – in majority of cases. This hinders landholders working knowledge of the gas laws and their rights to compensation. This limits the ability for landholders to obtain a mutually beneficial outcomes **Strategic Cropping Land (SCL)** • SCL is land that has the soil quality, topography and rainfall that allows more than one quality crop to be grown per year • In 2014, QGC lodged an application with the Qld DNRM to have the SCL status of some land in the Wandoan region removed • This impacted about 175 landholders, who had just 21 days to complete farm surveys and collate evidence of farming history. The timing of the QGC's application deepened the community's distrust of and the disillusionment of the gas industry. By lodging the application just before the repeal of the SCL Act 2011, QGC may negate the need to comply with more stringent environmental protection measures set under the new legislation (the Regional Planning Interests Act 2014) if wanting to pursue CSG development in the area. • It was unrealistic for QGC to expect that 175 field surveys could be commissioned in completed over 125,000 hectares within 21 days. To do so, is completely out of line with QGC's corporate principles of treating people 'with fairness, respect and decency'. • Was the above action by QGC a direct attempt to 'bully' landholders, to intimidate and harass farmers as a warning? **DISCUSSIONS:** • Will the gas industry be granted the right to repeal specific legislative conditions that are designed to protect the agriculture industry's portfolio, or landholders rights within negotiations?
Compensation	**Example from Queensland on Compensation Matters:** • Under legislation, gas companies are liable to compensate for any "compensatable effect" that is caused by the authorised activities on the land including: ○ Deprivation of possession of its surface ○ Diminution of its value ○ Diminution of the use made or that may be made of the land or any improvement on it ○ Severance of any part of the land from other parts of the land or from other land owned ○ Any cost, damage or loss arising from the carrying out of activities under the petroleum authority on the land ○ Accounting, legal, valuation and hydrology report the landholder necessarily and reasonably incurs to negotiate or prepare the agreement

What is the Reality:

- Accounting, legal, valuation and hydrology report the landholder necessarily and reasonably incurs to negotiate or prepare will only be compensated if the landholder signs and executes a CCA. Therefore, landholders are placed into a position that even if the negotiations are not fair or reasonable, the only means for the professional services to be paid is to sign a CCA
- Legal firms do not operate in the best interest of the landholder – due to them knowing that their fees will be paid no matter the outcome for the landholder
- How can a landholder be able to negotiate compensation for noise, light, air, health, stress, time without knowledge of what the future will be like?

QGC Compensation Offer to GT Bender included such clauses: (Richard Cottee was the MD for QGC at the time)

- Compensation Agreement was for all *present and future* compensation liability of the Tenement Holder in relation to all activities carried out or to be carried out…
    - Three (3) coal bed methane production wells with associated gas gathering and water handling and storage facilities
    - All support operations to allow for the drilling testing operation and maintenance of these wells and the construction and use of the ***associated*** facilities, and all associated roadworks, piping and fencing required to all the Tenement Holders and its contractors continued access to the Land for conducting the Operations
    - Compensation:
        - **Upfront Payment** of $3,183
        - **Reasonable Costs** – reimburse the Owner's reasonable costs in obtaining legal (only) advice and the execution of the agreement
        - **Annual Payment per well** of $265.00 per year (or part thereof) for each well to be drilled upon the land (or each infield compressor unit to be installed on the land), so long as the relevant well (or infield compressor unit) *remains operational*. Payment would be made in advance, and subsequent payment being made on the anniversary date of the agreement. Amount to be escalated each year as per Brisbane CPI
        - **Annual Payment for land** an amount of $531.00 per year (or part thereof) will be paid for each hectare of the land (or part thereof)
    - Bender's were also required to sign a "Release and Discharge – Water Use" agreement. This agreement was to release QGC from all liability for using water extracted from CSG drilling
        - Agreement that the water only used for stock purposes and the responsibility to ascertain whether the water is fit for this use was on the landholder
        - QGC made no representation and gives no warranty in respect of the quality of the water
        - To release and discharge QGC form all and any liability arising out of the use of the water and to use that water at the risk of the landholder
        - Indemnify and keep indemnified QGC against all and any claims and liabilities (including without limitation property damage and loss of stock) arising out of the use of the water
- The compensation agreements generally provide a fixed sum for compensation based on the number of wells (as above) rather than being based on any diminution of property value.
- Compensation is provided as *full and final* for those authorised activities and infrastructure, however those activities and infrastructure are generally defined in broad terms to provide the most flexibility of access and use to the gas company
- Note that there are no review provisions contained in the standard agreements, this could only be achieved through an application to the Land Court (as in the case of Nothdruth Vs QGC)
- However, it should be noted that payment of money from resource companies is not the motivator for a landholder signing, that is, more compensation will never replace privacy, health, clean water, air and soil etc

Origin Energy CCA terms:

- Refer to Appendix I, Origin Energy letter dated 9th January 2007, "If we can't come to a suitable agreement we may have no option but to proceed to Land and Resources Tribunal…"

Response to APPEA:

http://www.abc.net.au/news/2016-12-16/coal-seam-gas-mining-costs-farmers-millions-csiro-study-finds/8124834

	• APPEA's chief executive Dr Malcolm Roberts said the industry had brought benefits for farmers in many cases, "Farmers gain a stable source of drought-proof income…" o Explain how the above compensation offered by QGC of $265/yr/well is 'drought-proof income'? There is currently a landholder who has QGC in courts whose compensation does not even cover the cost of their food bill for a year.
Cumulative Risks	• Landholders are significantly impacted through disruption of land-use practices, surface impacts (including subsidence), air, water and soil contamination as well as the social and economic impacts. There is a lot of uncertainty and the significance of the potential impacts, the long-time periods for both the emergence of this impact and possible recovery (if possible) of their property • A list of issues that landholders have dealt with due to gas companies include: o Cattle not eating grass due to the amount of dust on pastures o Cattle eating plastic tap used by gas companies and die a painful death o Cattle falling into pipeline trenches and dying (includes wildlife) o Fences cut and cattle escaping, lost cattle o Pipeline subsidence o Beneficial water quantity unreliable, and quality issues that resulted in killing paddocks of crops o Calves born blind, birth defects, reproductive issues o Horses unable to reproduce • We really don't know the answer to the question of whether our food and water are safe from this gas drilling process • A CCA binds all parties to it, including successors in title to the land

Regulatory Framework

"the earth is not dying, it is being killed. and the people who are killing it have names and addresses" – Utah Phillips
(we start with names who have allowed risks to fall between the gaps)

The first 'red flag' is that there is currently no regulatory controls or frameworks which make it mandatory for hydraulic fracturing companies drilling wells to disclose the full list of chemicals. The potential for contamination, as a failure of the well hole casing would allow for a release of those chemicals into our drinking water.

The second 'red flag' is that gas companies are allowed to self-regulate, which is high risk as companies cut corners to increase company profits for shareholders before anything else.

The third 'red flag' is the requirement for gas companies to use confidentially and 'opt-out' clauses in agreements with landholders. If the industry was so 'great', why are landholders needing to be silenced?

Value	Comment and Feedback
Failure to protect the environment	• Make precautionary decisions that protect the environment from irreversible harm. Definition of precautionary principle is the Wingspread Statement, which summarises the principle this way: "*when an activity raises threats of harm to the environment or human health, precautionary measures should be taken even if some cause and effect relationships are not fully established scientifically.*" http://www.sehn.org/Volume_3-1.html. • A lack of data does not imply safety. A chemical with too many data gaps is classified as Benchmark-U "Unspecified Due to Insufficient Data" by GreenScreen for Safer Chemicals[45] • While Ohio regulations (1509.22) require that releases to surface waters not exceed Safe Drinking Water standards. These waste streams are not being safely managed and regulated in Ohio. Simply allowing waste materials to meet drinking water standards allows mixing at water treatment plants, that is, dilution, without adequate monitoring or measurement for radioactivity before or after discharge.[46] In the Queensland gasfields, this is termed 'the solution to pollution is dilution'. • Even with waste treatment facilities that have been designed to specifically treat the wastewater from the fracking process, radiological components, chemicals and toxins have been released and later detected in freshwater sources[47]. Proper sampling methodology needs to be put into place and strictly enforced to ensure that water quality is minimally affected by the treatment and release of this wastewater • The presence of naturally occurring BTEX has meant that an absolute ban cannot be applied, instead the prescribed limits are Benzene 1 part per billion (ppb); Toluene 180 ppb; Ethylbenzene 80 ppb; Xylene 75 ppb; x-Xylene 75 ppb; o-Xylene 350 ppb; p-Xylene 200 ppb.[48] **DISCUSSIONS:** • There is an important regulatory issue for the Environmental Department surrounding the millions of litres of hydraulic fracking fluid and the toxic flowback fluid that returns to the surface. Simply stating that no matter how toxic the fluid is, if it is produced by the industry, it is therefore by definition 'nontoxic', will not be accepted • How many chemicals are used by Hydraulic Fracturing companies that are classified as Benchmark-U (by GreenScreen)? Will the Northern Territory accept this as a high risk? • Limited air-emissions data for the gas industry across all infrastructure/facilities/wells/ponds is required. Will the Territory design a regulatory framework to remedy the incorrect or ineffective emission control strategies by the industry? This data is required to allow informed decisions to be made by the government on future environmental management. Watch the videos below and determine if these emissions should also be collected? https://www.facebook.com/john.jenkyn/videos/1932289667004296/

[45] GreenScreen for Safer Chemicals website: http://www.greenscreenchemcials.org
[46] Belcher, M., Resnikoff, M., Hydraulic Fracturing, Radiological Concerns for Ohio, Fact Sheet Prepared for FreshWater Accountability Project Ohio, 13 June 2013
[47] Ferrar, Kyle J., Drew R. Michanowicz, Charles L. Christen, Ned Mulcahy, Samantha L. Malone, and Ravi K. Sharma. "Assessment of Effluent Contaminants from Three Facilities Discharging Marcellus Shale Wastewater to Surface Waters in Pennsylvania." Environmental Science and Technology. 47.7 (2013): 3472-3481. Web. 21 May. 2013. <http://pubs.acs.org/doi/abs/10.1021/es301411q?source=cen>.
[48] Queensland Government, "Fraccing and BTEX" (Department of Environment, Heritage and Protection, 2016), http://www.ehp.qld.gov.au/management/non-mining/btex-chemicals.html viewed 16 April 2017

	https://www.facebook.com/GeorgeBender68/videos/1325400107576315/ - this is the Kenya East and Jammat Compressor Stations/Gasfields. There are no emission data on these activities. • Failure to protect the environment, landholder's land/health/environment will lead to a Class Action against the authority who provides approval
Land access	• This area has been addressed in the Land Access section above • Regulatory framework that allows a balance of rights can only be achieved by allowing a landholder to say no to access, there is no alternative to this
Public Health	In addition to the information provided in the above section: • It is critical to take a precautionary approach and make decisions that protect the public from exposure to toxic gas-related chemicals and from inherently hazardous gas production. Definition of the precautionary principle is the Wingspread Statement, which summarises the principle this way: "*when an activity raises threats of harm to the environment or human health, precautionary measures should be taken even if some cause and effect relationships are not fully established scientifically.*" http://www.sehn.org/Volume_3-1.html. • Burden of Proof is on the entity taking an action, however under a Precautionary Principle, the gas industry will have the obligation to prove that its actions do not cause public harm. The gas industry has followed the lead by the tobacco industry, that is, if a link between drilling operations and public health cannot be proven definitively, then the link is rejected, effectively putting the burden of proof on the victim (who will be in poor health, and financially incapable due to health bills and/or unemployment due to ill-health) • Ensure full disclose of all chemicals and transparency on all activities • Risk-based standards may not fully address the hazards of these chemicals, or combinations of chemicals (mixtures). For many chemicals used in both conventional and unconventional gas activities, communities and researchers have little or no data.[49] • A lack of data does not imply safety. A chemical with too many data gaps is classified as Benchmark-U "Unspecified Due to Insufficient Data" by GreenScreen for Safer Chemicals[50] • Determine and establish safety levels for all chemicals associated with gas production and mining, including taking into account the exposure scenarios and complex mixture of VOCs and chemicals • Provide ongoing monitoring, health evaluations and site remediation to protect people affected by gas production. This would include biomonitoring research and use results to effectively prevent exposure • Utilise results from community-based research on the exposure pathways of toxic gas chemicals, to more effectively reduce exposures and prevent harm to community members from chronic, recurrent exposure to gas chemicals and from the gas development as a whole • An example of one layer of silence that has allowed the unconventional gas industry to obtain a foothold in the States, is known as the Halliburton Amendment. This loophole can be found in their Energy Policy Act of 2005. This amendment exempts the fracking process from federal oversight under the Safe Drinking Water Act of 1974 and exempts companies that are doing Marcellus shale drilling from having to meet the requirements of the Clean Water Act[51]. If the industry was 'safe', why did the gas companies need an explicit exemption from the Act?? **DISCUSSIONS:** • Landholders who do not have 'agreement' in place with a gas companies, but whose health, lifestyle, any other adverse impacts (water issues, death in livestock etc) must also be included in regulation for compensation. Burden of proof lies with the industry (see next point) • Government will need to assign the burden of proof for avoiding any/all levels of harm. This will require careful scientific studies of the health effects of drilling operations. Consideration of animals, children and gas workers will all need to be included in the studies • Monitor our food supply for radium-226, which is found in both drilling waste and wastewater • Meanwhile, we shouldn't wait until all the science is in before we decide to protect the public's health • There is no "safe" level in food of the above mentioned toxic chemicals. The answer is that without complete testing, without many more dollars targeted to food safety research specifically related to chemical contamination from gas mining, we will never know. And as long as we don't know, the public health may be at risk.

[49] Bolden, A L, Kwiatkowski, C F, Colborn T (2015). New Look at BTEX: Are Ambient Levels a Problem? Environ Sci Technol. 2015 May 5; 49(9):5261-76.doi: 10.1021/es505316f. Epub 2015 Apr 15.
[50] GreenScreen for Safer Chemicals website: http://www.greenscreenchemcials.org
[51] Phillips, Susan. "Burning Question: What would life be like without the Halliburton Loophole?." State Impact. 05-12-2011. Web. 23 Apr 2013. http://stateimpact.npr.org/pennsylvania/2011/12/05/burning-question-what-would-life-be-like-without-the-halliburton-loophole/

Aboriginal cultural and communities	With all due respect to the traditional owners and aboriginal people, the intimate details of their culture is outside my area of knowledge
Social Impacts	• It is a basic human right for all to be informed about exposure to hazardous chemicals and to be protected from them • Social impacts has been addressed in the relevant section above
Economic Impacts	**Gas tax review confirms nation faces decade wait for revenue from global giants** (2017): http://www.smh.com.au/federal-politics/political-news/gas-tax-review-confirms-decade-wait-for-revenue-from-global-giants-20170428-gvuvo2.html • Multinational gas companies will soon sell an annual $50 billion worth of Australian liquefied natural gas to foreign markets, but the nation will have to wait more than a decade for any revenue boost and some projects will never pay a cent in tax for the resources they extract • The Senate inquiry into corporate tax avoidance grilled LNG bosses in Perth • The petroleum industry mounted a fierce lobbying effort against changes to the PRRT • Chevron lost a Federal Court appeal in a profit-shifting case brought against it by the Australian Tax Office • The industry holds a stockpile of $238 billion in tax credits, which some academics believe will shield major companies from paying any PRRT for decades • The sector would pay just $12 billion in PRRT by 2027. In that period, sales to such markets as Japan, South Korea and China could conservatively top $400 billion • But more PRRT would be paid between 2027 and 2050, up to $105 billion in total, or $3.2 billion a year • By comparison, Qatar, which is currently the world's biggest LNG exporter, is forecast to take $26.6 billion through its flat, volume-based royalty in 2021, when it will sell the same amount of LNG as Australia • "It appears reducing paperwork for multinational corporations has been prioritised over protecting the Australian community and our shared interest in these resources," Tax Justice spokesman Jason Ward said. • "This report and the response from the Treasurer will only increase community concern over the integrity of the PRRT and represents a significant missed opportunity." **Origin LNG consortium used 'transfer pricing' to cut taxes (2016):** http://www.afr.com/news/politics/origin-lng-consortium-used-transfer-pricing-to-cut-taxes-20160426-gofb0q • The royalty spat between the Queensland government and a major gas consortium has flared up with a petroleum exploration company claiming big liquefied natural gas producers used transfer pricing to reduce their royalties bill • Queensland's Office of State Revenue uses the so-called "netback method" to determine royalties paid into state coffers. • Under the Queensland system, royalties are payable at 10 per cent of the well head value – the amount that could reasonably be expected to be realised if sold on a commercial basis – less deductable operational and capital costs • Tri-Star claims the current royalty pricing structure "could be prone to transfer pricing, which allows operators to avoid paying their fair share of royalties" • "Because the largest Queensland operators own all associated infrastructure and sell CSG to themselves rather than a third party, they are currently able to use a variety of methods to reduce the value of the CSG at the well head - and the royalties paid," the document said • Tri-Star - which has been in a long-running dispute with Origin wanting to trigger "reversion rights" over coal seam gas reserves - proposed the Queensland government put a fixed tariff on LNG and pipeline proceeds which would provide a low-risk rate of return of no more than 8 per cent to 10 per cent • The lawyer did not address the claims of LNG producers attempting to "game the system" or inflating their costs • The LNG industry has boosted economic growth in Queensland, but has so far failed to be the cash cow originally expected for the state government • In the mid-year budget update in December, LNG royalties were downgraded from $129 million to $33 million for this financial year. • It remains unclear whether the Queensland government has toughened its royalties negotiations since BG's was finalised a few years ago. But industry sources said it was was one of the reasons for the legal challenge

Compliance and enforcement	• The natural gas industry eager to develop the Marcellus and Utica shales, have been successfully deploying this relatively new and **highly unregulated process** by promising jobs to Ohio workers, campaign contributions to legislators, and by providing revenue to regulators and royalty payments to landowners • Under the Qld EP Act 1994, there is a duty by the companies to notify where serious or material environmental harm is caused or threatened by an act or omission – this is self-regulation that will never work o **Chilling tale of Origin Energy whistleblower** http://www.smh.com.au/business/energy/chilling-tale-of-origin-energy-whistleblower-20170124-gtxuhz.html ▪ McDow's case, to be heard in the Federal Court, will outline how she became a whistleblower at Origin Energy in 2015, her subsequent treatment and the impact on her life and career after she was made redundant in October 2015 (same month that George Bender died) ▪ She was a lawyer with 17 years' experience in senior compliance roles, working on international investigations and policy developments related to money laundering (Enron, organised crime and Christopher Skase), corruption and bribery, ethics and employee codes of conduct ▪ McDow's statement of claim alleges Origin is a company with serious compliance failures at its gas and oilfields, it has a culture of leaks, spills and explosions, and victimises and intimidates anyone who dares to speak out ▪ She alleges executives right up to the top, including former chief executive Grant King, who is now president of the Business Council of Australia, covered up some of the compliance failures, some of which were serious and should have been reported to the regulators and the ASX ▪ ***Equally disturbing is the allegation that she isn't the only whistleblower to raise compliance concerns inside Origin*** ▪ One whistleblower, allegedly a field, health, safety operations and maintenance officer, told McDow she had reported on November 5, 2012 to senior executives a culture of cover-up at APLNG sites and a lack of compliance with mandatory standards, rules, legislative obligations relating to safety. Alleged harassment and victimisation forced her to leave in early-2013. ▪ Another whistleblower, allegedly a pipelines supervisor on the APLNG project, lodged a w*histleblower report in mid-2013, outlining a series of concerns that the pipelines were "continuing to be operated, despite a lack of preventative maintenance which should have been reported to regulators and which could result in an increased risk of pipeline asset failure"* o http://www.smh.com.au/business/energy/origin-energy-denies-cover-up-after-accusation-in-explosive-lawsuit-20170124-gtxhkx.html ▪ The 66-page amended statement of claim filed in the Federal Court on Monday alleges a management cover-up that includes serious non-compliance with regulations relating to safety and the environment, hundreds of wells in Australia and New Zealand that hadn't been maintained for more than 10 years, leaks of oil and gas, contaminations, a failure to inform regulators or the ASX of breaches and the material altering of reports to the board on risk and compliance issues ▪ In at least one case the regulatory and legislative breaches were so serious they could have cost people their lives, the claim alleges. To fix some of the problems would have allegedly cost tens of millions of dollars ▪ Mr King is alleged to have altered reports to the board to delete references to material risk issues including those relating to non-compliance with mandatory legislative and regulatory obligations for the electricity division, upstream divisions and the multi-billion dollar Australia Pacific LNG project ▪ "serious and material" that had not been entered into the OCIS, which is a mandatory database for regulatory incidents. The breaches were allegedly not reported to regulators ▪ She cites a former head of compliance for Origin telling her in November 2012 that in his 28 years in global senior compliance he had never seen such a "poor and fundamentally broken compliance program than that which existed at Origin." ▪ In December 2013 an "incident" occurred at a gas well at Beharra Springs in Western Australian and that at a meeting of 60 staff, the chief executive of Origin upstream, who has since left, described it as "the worst he had been involved in his 35 year oil and gas career internationally."

	• Under the Qld Petroleum legislation, a gas operator is required to report well head leaks during its CSG operations. Self-regulation of this nature is unreliable as an operator failed to notify both the government and landholder in a timely manner of a spill and well-head leak in 2011. How do the operators monitor the huge number of wells across vast area of land? 24/7 real-time monitoring and automatic shut-off is a mandatory requirement across all infrastructure – every valve, connection above and below ground **Discussion - Technical Considerations:** • Fracking should be avoided in areas of water scarcity (note: Australia is a dry continent), in all areas where it can impact on agricultural production (crops and livestock) • Rigorous training and strict oversight to prevent surface spills and leaks from wells and ensure that any waste fluids and solids are disposed of properly (accountability for all waste produced) • Minimise climate impacts, implement a zero-venting and flaring policy. Implement real-time gas monitoring and automated value shut-off or shut down if any minor leak is detected. • CO_2 can react with materials used to construct a well e.g. it is known to reduce cement's strength and increase its permeability, it can also corrode steel and thus injection wells should be designed to minimise this risk.[52]
Complexity	• Needlessly complex for who? The industry would not comply with even the simplest of regulatory framework **Regulatory Approach in Queensland – a failure of the worst kind:** • Current regulatory approach in Qld is based on the philosophy of adaptive environmental management. This method of "learning by doing" is implemented in Qld primarily through the imposition of layered monitoring and reporting duties on the CSG operator alongside obligations to compensate and "make good" harm caused. o The National Water Commission (NWC) called for "an adaptive and precautionary management approach" to be adopted in relation to CSG projects in Australia[53] o However, the Qld Government asserted that the regulatory approach was based on the principles of adaptive environmental management only. It is heavily reliant on the implementation of a systematic approach to continuous monitoring, evaluation and enhancement of the regulatory framework. o Adaptive environmental management does not have a particularly strong track record.[54] For it to have been successful, the regulator must be able to process the necessary information and draw meaningful conclusions. o It is not successful if used by management agencies as a basis for postponing difficult decisions that need to be made in the face of resource constraints and scientific uncertainty.[55] o The Qld regulatory approach is one that is designed to *facilitate* the resource extraction projects while *assuming* the regulatory approach will be able to be changed, to an appropriate level and within a sufficient timeframe, to avoid any adverse environmental impacts – this was a very ambitious undertaking![56] • The Qld regulatory framework is a complex legal web which, ultimately, is designed to allow CSG projects to proceed in Qld subject to requirements for monitoring, reporting and adjustment of industry practices as new information emerges o The Qld Government approved the gas projects without understanding the severity of the impacts, especially hydrologically and property rights o It is clear that the Qld approach does not exhibit all the necessary hallmarks of a *true* adaptive environmental management approach, hence there are significant failures o The only use of adaptive environmental management principles has been essentially limited to the management of impacts on groundwater and water bores from CSG activities o Overall objectives and key performance indicators are critical prerequisites for an effective adaptive management approach and are missing from the Qld response

[52] Nygaard, R., 2010, Well design and well integrity, Energy and Environmental Systems Group, Institute for sustainable energy, environment and economy, University of Calgary, pp.39, Calgary, Canada
[53] National Water Commission "Position Statement: Coal Seam Gas and Water" (December 2010, Australian Government) at 1
[54] Gregory, R., Ohlson, D., Arvai, J., "Deconstructing Adaptive Management: Criteria for Applications to Environmental Management" (2006) 16(6) *Ecological Applications* 2411 at 2411
[55] Gregory et al, n 38 at 2411
[56] Swayne, N., "Regulating Coal Seam Gas in Queensland: Lessons in an Adaptive Environmental Management Approach?", 2012, Evironmental and Planning Law Journal 163-185

	○ Any parameters for the evaluation and adjustment of the current Qld regulatory framework have not been released into the public domain ○ The failure to integrate the principles of adaptive environmental management into the Qld legal framework, potentially leaves a fatal disconnect between the decision-making and approval processes under the legislation and the broad adaptive management principles located within the Qld government policy documentation ○ The Qld approach to adaptive management, in its current manifestation without clear objectives, performance indicators or criteria for evaluation or response, is unlikely to be successful ○ The adaptive management approach be integrated into statutory provisions for the approval and management of gas projects ○ Requires the creation of an appropriate decision-making framework against which the Qld regulatory approach could be tested and amended, and it would require that the statutory regime be designed with sufficient flexibility to enable changes to be made to the regulatory framework in response to the improved knowledge and understanding of the impacts of the gas projects ○ A truly adaptive environmental management approach must be able to embrace the hard decisions that go with "learning by doing" including the ultimate decision of CEASING gas activities in Qld in the face of significant information gaps and/or an unacceptable high risk of cumulative adverse impacts **Policy Considerations:** • Improving environmental governance such as: ○ Mandating full disclose of products used in the fracking process and banning substances known to be harmful (in additional to BTEX) ○ Implementing full-time monitoring and enforcement procedures ○ Robust regulations and adherence to industry best practices should be followed, particularly in the areas of well design and cementing, in order to completely isolate the well from other strata, and especially from freshwater aquifers. Industry to confirm how they will VERIFY the integrity of the well casing by alternative methods other than the mud/cement return?? ○ Government to ensure that companies secure enough funds for rehabilitation of land and mitigate and potential impacts on land and water, in order to avoid so-called "extract and run" practices (gas company declaring bankruptcy after a large accident, or after the end of the gas extraction) ○ If NT Government are going to promote gas as being a transition from carbon-based energy sources, they should design a plan to achieve this transition. Laws, taxes or other incentives would need to be in place to assure that a certain level of gas-related royalties (profit) are re-invested in research and development on alternative sources of energy, such as wind, solar, hydro, geothermal, tidal and on energy-saving policies • Self-regulation by the industry must be avoided at all cost • Health data from the U.S. (e.g. Pavillion area) indicate that there is enough emission data available to justify the requirement for aggressive protection, precautionary standards for chemical emissions for the protection of public health and environment • Observations on this gas debate is often focused on what can be done to make it safer, rather than taking a more precautionary approach, where the intrinsic hazards of the chemicals being emitted are taken into account, which asks whether or not gas activities can be carried out safely, ***period*** • The Precautionary Principle enables us to make decisions based not on irrefutable proof of cause-and-effect relationships but on prevention and protection, based on what we do know
Regulatory capture	• It is not successful if used by management agencies as a basis for postponing difficult decisions that need to be made in the face of resource constraints and scientific uncertainty.[57] **Details below have been extracted from the Senate Submission No.316** http://www.aph.gov.au/Parliamentary_Business/Committees/Senate/Gasmining/Gasmining/Submissions **The 'LNG Committee', 'Constitutional innovation' and 'Court of Star Chamber'**

[57] Gregory et al, n 38 at 2411

In the abovementioned transcript, Senator Waters asked about the 'LNG Committee' mentioned in Ian Fletcher's email to Queensland Treasurer, Andrew Fraser, on 12 May 2010[58]. The transcript quotes from the email:

"*Ian Fletcher says: 'David Maxwell said that QGC would like to appear in front of the LNG committee to explain his position in respect of the EIS.' He uses the words 'a degree of constitutional innovation' … he puts a question mark over the following words: 'the LNG committee as a Court of Star Chamber*'."

I herby confirm for the record that the 'LNG Committee' was the LNG cabinet sub-committee, formed in March 2010[59]. The LNG Cabinet Sub-Committee was composed of the following Queensland cabinet Ministers:

- Treasurer and Minister for Employment and Economic Development (Chair)
- Minister for Natural Resources, Mines and Energy, and Minister for Trade
- Minister for Primary Industries, Fisheries, Rural and Regional Queensland
- Minister for Infrastructure and Planning
- Minister for Climate Change and Sustainability[60]

Assessment by Queensland's environment department:

- The 'Final Advice' regarding QGC's Queensland Curtis LNG Project EIS, from the Queensland Department of Natural Resource Management (DNRM) to The Coordinator-General on 2 June 2010, is found within Right To Information document 12-330, File C, Part 1.[61] It notes:

  "…there are aspects of the QCLNG Project where insufficient information has been provided in the EIS and SEIS for DERM to assess the potential environmental impacts…"

  The advice provides a detailed and substantial list of outstanding information.

Ms Marsh states in her submission:

- At the Senate Inquiry into Queensland Government Administration Related to Commonwealth Government Affairs in 2014, senators with conflicts of interest with regards to CSG industry received and heard my evidence. Key documents and the Committee Hansard transcript were suppressed for several months. Despite a Senator acknowledging[62], "substantial allegations" had been made "against public servants, lawyers and other people", the matters have not since been investigated:

  "Senator Macdonald said Ms Marsh's evidence had been withheld because it made "substantial allegations" against public servants, lawyers and other people. "If things are made public, all of them will of necessity be entitled to come forward to clear their names," he said."[63]

Table 1. False and/or misleading statements by unconventional gas industry representatives regarding the ABC Four Corners 'GasLeak!' program, 1 April 2013.

Representatives and context	False and/or misleading statements	Evidence
Rick Wilkinson, ex-Santos, APPEA Interview by ABC 4 Corners journalist Matthew Carney	Mr Wilkinson makes numerous statements implying that missing information was supplied in a Supplementary EIS after The	The ABC makes an Editor's Note at the end of the interview (p.18) correcting the record: "*The supplementary Environmental Impact Statement does not occur after the Co-ordinator General's*

[58] Refer to evidence taken in camera by the Senate Select Committee inquiry into Queensland Government Administration related to Commonwealth Government Affairs, 28/11/2014
http://parlinfo.aph.gov.au/parlInfo/search/display/display.w3p;db=COMMITTEES;id=committees/commsen/9e7a99b6-f87b-4ac0-a713-d192a8889516/0001;query=Id:%22committees/commsen/9e7a99b6-f87b-4ac0-a713-d192a8889516/0000%22
[59] Queensland Government. Queensland's LNG Industry: Once in a generation opportunity for a generation of employment (November 2010) Retrieved from http://rti.cabinet.qld.gov.au/documents/2010/nov/lng%20blueprint/Attachments/LNG%20Blueprint.pdf
[60] Queensland Government. Queensland's LNG Industry: Once in a generation opportunity for a generation of employment (November 2010) Retrieved from http://rti.cabinet.qld.gov.au/documents/2010/nov/lng%20blueprint/Attachments/LNG%20Blueprint.pdf
[61] Released by DNRM under RTI Act 2009
[62] Peter Hannam, The Sydney Morning Herald, 1 March 2015. Senators move to give CSG whistleblower air. Retrieved from http://www.smh.com.au/environment/senators-move-to-give-csg-whistleblower-air-20150227-13qvmm.html#ixzz42PnGUjeE
[63] Peter Hannam, The Sydney Morning Herald, 1 March 2015. Senators move to give CSG whistleblower air. Retrieved from http://www.smh.com.au/environment/senators-move-to-give-csg-whistleblower-air-20150227-13qvmm.html#ixzz42PnGUjeE

(March, 2013)	Coordinator-General's Evaluation Report.[64]	*Report. It is part of the Co-ordinator General's assessment process.* "[65]
David Knox, Santos Interview by Fran Kelly, ABC Radio National and repeated on ABC Inside Business[66] (April, 2013)	*"…there is some falsehoods and dishonest claims being made. There was a very extensive set of groundwater studies done…We do not in any way affect the groundwater in any substantive way. And that's what the studies show."*	Significant groundwater drawdowns in localized regions were predicted in company and government reports. A lack of baseline data, has been documented by independent researchers - as noted in this submission.
Tracy Winters, BG Group (QGC) Questioning by Senate Standing Committee on Environment and Communications (18 April 2013). Senate hearing on EPBC Amendment Bill. [67]	*"Our submission was made to government, with all of our studies, in 2008 … She [Simone Marsh] was brought in after the assessment which took two years to conduct, had been completed"* [68]	The EIS was released on 29 August 2009. The Supplementary EIS, in which QGC significantly up-scaled the project, was released on 10 February 2010. [69] The Coordinator-General's EIS evaluation abruptly ended on 23 June 2010, coinciding with my last day of work on the CSG-LNG projects. Note: In 2010 Ms Winters was employed as Principal Resources and Energy Advisor and Chief of Staff to the federal Resources and Energy Minister, Martin Ferguson. Minister Ferguson was present at the March 2010 sale of Queensland's gas in Beijing (which occurred before the legislated approvals processes had been completed). Both Ms Winters and Martin Ferguson later moved from their government roles into BG Group.

- It is highly advised that the Panel read Submission 316 to fully understand the implications of the involvement, collusion and corruption of the Queensland Government and the gas industry

Too Close for Comfort:
http://www.tai.org.au/content/too-close-comfort

- Examines the relationship between the Queensland Government and the fossil fuel industry. The report reveals a pattern of secrecy, a lack of accountability and transparency and a fast moving revolving door between the highest level of the bureaucracy and government, where political donations may well be just the tip of the iceberg
- The cosy relationship between the senior government representatives in Queensland and the resource industry is at odds with the fundamental principle that all interested parties are treated equally in the decision-making process. It also undermines the ability of Queenslanders to negotiate the best deal for the one-off exploitation of their non-renewable resources, and the protection of the community against the negative impacts of the states ever expanding resource industry
- Finally, can concerns about a lack of action on climate change and fossil fuel emissions ever be addressed in an environment where governments and public officials at all levels have such close and secretive relationships with coal and gas industries?

Queensland: Bureaucrat string puller one day, CSG mining big shot the next!
https://independentaustralia.net/business/business-display/queensland-bureaucrat-string-puller-one-day-csg-mining-big-shot-the-next,7561

[64] Retrieved from http://www.abc.net.au/4corners/documents/CSG2013/Wilkinson_transcript.pdf
[65] ABC Inside Business http://www.abc.net.au/insidebusiness/content/2011/s3731460.htm
[66] Retrieved from https://vimeo.com/64289148
[67] Retrieved from https://vimeo.com/64289148
[68] Retrieved from https://vimeo.com/64289148
[69] Retrieved from http://www.statedevelopment.qld.gov.au/assessments-and-approvals/queensland-curtis-liquefied-natural-gas-project.html

	• DNRM's Media Manager, Paul Lynch. Instead of simply 'replying', it appears he mistakenly pressed the 'reply all' button and so the following email turned up in the in-tray of IA journalist, Lachlan Barker, revealing a culture which should be of concern to all Queenslanders • Interesting reading, I encourage the Panel to take a read of how the gas industry moves in not so mysterious ways!
Cumulative Risks	• What has been witnessed in Queensland, is that the gas companies agree initially with the Environmental Authority (EA) to obtain an approval to proceed, however the companies than just apply for EA Amendments as they are unable to meet the initial EA requirements • Investigate the harmful impacts of cumulative exposure to multiple chemicals and how their toxicity may increase when they interact in mixtures, especially chemicals with endocrine disrupting effects, which may act at low levels. Currently there is no adequate methods to assess how the chemicals in a mixture may interact synergistically or additively in ways that may cause harm to human health.[70]

[70] Mauderly, J., and Samet, J., (2009). "*Is There Evidence for Synergy Among Air Pollutants in Causing Health Effects?*", Environ Health Perspect; DOI:10.1289/ehp.11654. http://www.ncbi.nlm.nih.gov/pmc/articles/PMC2627851.

Appendix

APPENDIX A

LANDHOLDER SERVICES

Pty Ltd ACN 056 205 693 ABN 94 056 205 693

13 Cottesloe Street
Toowoomba Q'ld 4350

Phone 07 4632 1024
Fax 07 4632 1768

[redacted]

179 229 Incitec Pivot Contract & Water Tests.

Mr. D. Brown
Director
Environment (Southern Region)
Environmental Protection Agency
GPO Box 2771
BRISBANE QLD 4001

COPY George & Pam Bender

2 August 2005

Dear Mr. Brown,

RE: ENVIRONMENTAL AUTHORITY No. 150 262 PETROLEUM LEASE 179 "ARGYLE"

ENVIRONMENTAL AUTHORITY No. 150 339 PETROLEUM LEASE 229 "WAMBO"

I write on behalf of my landholder clients -
.Mr. and Mrs. J. Lloyd and Mr. and Mrs. D. Hubbard (re PL 179 and EA 150 262), and
.Mr. and Mrs. G. Bender (re PL 229 and EA 150 339) -
whom I shall collectively refer to as "the Owners".

The Owners' land is affected by the Argyle Coal Seam Gas Project. Queensland Gas Limited ("QGC") is the operator for the Joint Venture.

We ask that EPA consider and respond to the questions set out hereunder, and summarised here for convenience, concerning the true nature of QGC's proposed activities and the adequacy and validity of the abovementioned envronmental authorities.

1. **Given the evidence of a combination of very large volumes of associated water and extreme quality defects in that water with proportionate environmential risks, are Level 2 environmental authorities adequate ?**

2. **Regarding the EIAs and EMPs submitted for these environmental authorities-**

   a) **do they satisfactorily disclose the expected volume and quality of associated water; and**

   b) **do they present satisfactory plans for its containment, transport across the lease areas, and its disposal; and**

   c) **do they contain satisfactory plans to manage the environmental risks and impacts; and**

   d) **has QGC complied with its obligation to disclose the relevant information in its applications for environmental authority ?**

3. **Should an environmental authority pursuant to the Environmental Protection Act ("the Act") as in force from 1 January 2005 have been issued for the amended PL 179?**

4. **Was a single project environmental authority application required for the Argyle Project pursuant to the Act s.83 (instead of the three separate applications which were lodged) ?**

5. **Because the Minister never granted the application originally described as PL 179, do you agree the environmental authority No.150 262 was not in force as per s.639(3) of the Act as at 1 January 2005 - and**

   .do you agree it was not an "undecided application" as per s.640(1) of the Act, and

   .do you agree that even if it could have properly been treated as a decided application able to take effect through transitional provisions, that would only be in relation to the orginal PL 179 application for which it was issued ?

The Owners have been notified of immediate development of the Argyle field (containing the "Argyle", "Wambo" and also the "Kenya" leases) for production. QGC has notified them that it requires compensation agreements to be completed as a matter of urgency - it originally set a deadline of 30th June last.

However, the Owners cannot negotiate compensation until some major gaps in disclosure of the activities and management of their environmental impacts are filled. Clarification of questions surrounding the environmental authorities is an essential step.

Impacts on the Owners' existing land use and lifestyle which concern them are, for example:

- on the Hubbards' property, 36 gas wells, each with pumps driven by combustion engines and water separators, 28 such wells on the Lloyds' property, and 3 such wells on the Benders' property;

- plus service infrastructure such as a network of gravelled roads to each well, gas gathering pipelines (apparently above-ground), nodal compressors and buried gas transport pipelines, and water pipelines to every well, plus at least one water storages (not acknowledged in the EIA). As well, heavy intrusion by way of well drilling and construction teams and equipment and the constant presence of operation and maintenence teams; and

- large volumes of potentially damaging associated water being produced, transmitted, stored and evaporated with serious risk of adverse effects on soils, stock, and via seepage into groundwater aquifers and streams.

QGC suggest the water will be collected in installations on PL 229 and supplied to outside users. We set out below the reasons why we are dubious about that assurance, and why we think it is much more likely that additional big evaporation ponds will be required, either on the Owners' land or located in PL 229 on QGC's land. We also explain concerns that the Owners' water storages downstream of QGC's ponds will be (as one already is) at risk of contamination from seepage - ie. escaped water entering the watercourse.

Volume and Impacts of Associated Water

We ask if the EPA is aware of repeated public announcements on QGC's website (*www.qgc.com.au*) showing that the Aryle Project will produce some thousands of megalitres of associated water a year. For example, see ASX Announcement dated 4th February 2005 showed the Argyle East Pilot of 5 wells had produced water at a rate in excess of 16,000 barrels per day **(copy Attachment "A")**. At 159 litres/barrel, the combined production of those 5 wells was the equivalent of about 2.4 megalitres per day or 928 megalitres per year. It would only take 16 such wells to produce about 3,000 megalitres per year.

Test reports on water sampled both by QGC and Mr. David Hubbard from wells in the Argyle Pilot are attached (**see Attachment "B"**). The laboratory report by Casco Australia Pty Ltd, and verbal advice received from Messrs. Ed Power and Andrew Briggs of Department of Natural Resources and Mines in Toowoomba are the basis of the Owners' concerns including -

a. That because of its extraordinarily high corrected adsorption ratio of around 625, the associated water will destroy the structure of any soil - permanently if the exposure is frequent or prolonged. It is authoritatively described as "extreme bicarbonate" water.

b. That means the bed and banks of any storages or evaporation ponds, and all areas of repeated spillage, will be permanently degraded.

c. Since seepage is inevitable to a greater or lesser extent from all the earth storages (unless lined, which is apparently not practicable over the large areas of such evaporation ponds) there is a high risk of contamination of groundwater aquifers and possibly of watercourses, and of any private storages downstream of the project, and the Condamine River (bore logs show sand close to the surface on the river flats - NR&M). In surface water, stratification would ensure this water stayed low in the waterbody, where it is resistant to flushing and right in the suction zone of normal pumps.

d. Evaporation ponds will ultimately concentrate salts to saturation point - in which case the end result could be a large block of salt.

e. The flouride content of about 4mg/L exceeds the guideline level of 2 mg/L and with bicarbonate alkilinity above 600mg/L the water is unsuitable for, and poses some risks for stock. We take serious issue with the water quality condition of 9 mg/L flouride in Standard Environmental Conditions Appendix B. ANZECC and QDPI uniformly state a safe level of 2mg/L for stock.

In the light of those facts the Owners are very concerned, especially when the Argyle and Wambo EIA and EMP state (in section 7) that:

(a) the quantities of water are unknown; and

(b) quality of the water is unknown; and

(c) the water will be disposed of to landholders including a major feedlot, or else other beneficial uses will be found for it (without clarifying whether that depends on treatment of the water, and without showing any evidence that treatment is economically and logistically feasible); and

(d) only as a fall-back, will QGC construct "large evaporation ponds"

Furthermore, QGC has stated, in a letter to affected landowners (**see Attachment "C"**) that the water "*.. is not saline and can be used for irrigation or stock*".

Question:

1. **Given the evidence of a combination of very large volumes of associated water and extreme quality defects in that water with proportionate environmental risks, are Level 2 environmental authorities adequate ?**

The EIAs and EMPs for Argyle and Wambo give no volume data for associated water - see sections 8.5, 8.6 and 9.13 especially (though such data has appeared often in ASX announcements).

And, the extremely adverse expert assessments of the quality of the associated water, although known to QGC, are not disclosed nor dealt with in those EIA and EMP documents.

The only quality defect acknowledged by the author of those documents is - "*.. relatively low salinity levels*" - and stating that the possibility of such water entering the surface drainage system is not "*an issue of major concern*" (section 8.5).

The Argyle and Wambo EMPs say that produced water will be pumped to existing ponds on "Wambo Downs South" (owned by QGC), and that " .. *if it becomes necessary to construct evaporation ponds on the PLA, then they will be the subject of a separate EIA and EMP*".

The Wambo EMP (section 6) says those existing ponds each cover "*3.9 hectares disturbance*" (presumably by their outside dimensions, and presumably so designed in order to comply with the 4 hectare maximum area in Condition 1 of the Standard Environmental Conditions). But these ponds are quite small by evaporation pond standards - for example Origin Energy's pond for its pilot coal seam gas project on the nearby PL 180 is, I understand, 55 hectares in area - and from personal knowledge, pilot project evaporation ponds on QGC's Berwyndale South pilot were of similar area to that. It seems quite unlikely that the existing ponds on the Wambo lease are adequate for the production-level activities, even if some of the water is being distributed to other users which seems to be wishful thinking.

The EIAs and EMPs do not disclose that QGC has for some time been conducting a feasibility study on a proposed large water storage or "buffer pond" with 20 hectare water surface area in a 30 hectare enclosure on the Lloyds' property "Wieambilla". QGC has negotiated with them about its location - and has confirmed this in writing. And, Mr. David Hubbard advises me that QGC is actually seeking three such sites altogether.

Question:

2. **Regarding the EIAs and EMPs submitted for these environmental authorities -**

   a) **do they satisfactorily disclose the expected volume and quality of associated water; and**

   b) **do they present satisfactory plans for its containment, its transport across the lease areas and its disposal; and**

   c) **do they contain satisfactory plans to manage the environmental risks and impacts; and**

   d) **has QGC complied with its obligation to disclose the relevant information in its applications for environmental authority ?**

Existing Environmental Authorities

In addressing the above questions, would you please have regard to the Owners' concerns including -

- whether EA No. 150 262 is a valid and appropriate authority for PL 179; and

. whether the holders can comply, either with the less onerous conditions of EA No. 150 262 or with the current Level 2 EA No. 150 339 - especially relating to associated water and land disturbance (ie. whether conversion to Level 1 authority(s) is required)

I would like to draw attention to the following issues:-

EA 150 262

. firstly, whether EA 150 262 was validly issued as the environmental authority for the current PL 179, and

. secondly, whether in any case the proposed activities of the holder, Queensland Gas, would be unable to comply with the Code on which EA 150 262 is based.

Documents obtained from the EPA and NR&M appear to show (in summary) -

a. A petroleum lease application numbered PL 179 was lodged with Natural Resources and Mines ("NR&M") on 13th February 2001. However, from the outset the size of that application was officially regarded as excessive. It was never granted and various exchanges took place in regard to rejecting it or splitting it.

b. According to the Register Search, in March 2004 NR&M as delegate for the EPA purported to issue EA 150 262 in respect of that application - despite having itself declared the original PL 179 application unacceptable. Conditions of EA 150 262 were as per the *Interim Policy - Environmental Management for Activities under Petroleum Tenures* (4th September 1995).

c. The applicants subsequently, on about 23 February 2005, made three fresh petroleum lease applications to NR&M, splitting the previous application into three new separate leases - numbered PL 179 (at the applicants' specific request), PL 228 and PL 229. Thus the original application numbered PL 179 was shown by its applicant to be redundant.

d. Also on 23 February 2005 the applicants made three fresh environmental authority applications to the EPA (which had assumed operational responsibility on 1 January 2005). QGC's covering letter confirmed *the requirement to split PLA 179 in to 3 separate applications*. QGC requested that the existing "approved" authority be split, and enclosed three new environmental authority applications *to ensure complete documentation to expedite the issue of the relevant EAs and grant of the 3 tenures*.

e. But only two of those three new applications resulted in issue of new environmental authorities, ie. for PL 228 and PL 229. Why then, was EA 150 262 - previously issued for a different petroleum lease and now with outdated conditions - transferred to the new petroleum lease. That new lease just happened, because the applicant requested it, to have the same number, PL 179. (see attachment "D")

The fate of that new environmental authority application in respect of PL 179, dated 21st February 2005, is unknown to us.

A Chronology showing the sequence of events set out in the documents we have so far obtained is Attachment "E".

Please also have regard to these queries re EA 150 262 -

(i) page 5, "Natural Waters": can the volume of groundwater discharged from petroleum wells be "minimised" as required; and

(ii) will the discharge of water from groundwater resources underlying the tenement exceed the Code's maximum 250ML per annum

(iii) as to land resources, will QGC's activity sites exceed the limit of 500 square metres significant disturbance. (water storages or evaporation ponds, for example - and QGC has written to the Owners stating that, depending on the type of drilling rig used, each well site will disturb between 900 square metres and 10,000 square metres).

Regarding EA 159 339 -

Will the activities comply with the conditions of this "new" environmental authority - in particular:

Standard Condition 1: Given the volume of water, will it be feasible for water storages or evaporation ponds, whether located on QGC's land or the Owners' land, be limited to 4 hectares.

Standard Condition 15: In the light of expert advice of extreme quality defects, will the water be regarded as compliant with either Table 1 or Table 2 in Appendix B.

Legislative Requirements

NR&M will not make the relevant documents (other than a register search) available. A Freedom of Information application has been lodged but access to the documents is still some weeks away.

However, on the basis of documents obtained mainly from the EPA, these further questions are asked -

3. Should an environmental authority pursuant to the Environmental Protection Act ("the Act") as in force from 1 January 2005 have been issued for the amended PL 179 ?

4. Was a single project authority application required for the Argyle Project pursuant to the Act s.83 (instead of the three separate applications which were lodged) ?

5. Because the Minister never granted the original PL 179, do you agree the environmental authority No. 150 262 was not in force as per s.639(3) of the Act as at 1 January 2005 - and

   .do you agree it was not an "undecided application" as per s.640(1) of the Act, and

   .do you agree that even if it could have properly been treated as a decided application able to take effect through transitional provisions, that would only be in relation to the orginal PL 179 application for which it was issued ?

The matters raised here seem unusually complex, particularly because they involve new and unfamiliar regimes, including transitional provisions in both the Environmental Protection Act and the Petroleum and Gas Act.

I would appreciate it if, at an early stage I could meet you to discuss and explain as appropriate.

Yours sincerely

George Houen

G.T. Houen
LANDHOLDER SERVICES PTY LTD

Copy: Mr. E. Power
Principal Officer, Land Management & Planning
NR&M Toowoomba

LIST OF ATTACHMENTS

"A" Queensland Gas ASX Announcement dated 4th February 2005

"B" Water Test Reports

"C" QGC letter dated 12th May 2005

"D" QGC email dated 11th May 2005

"E" Chronology

Appendix B

Photos of Health Impacts on Pigs


Photo 1: 24 January 2016, young weaner euthanized. Gas flaring


Photo 2: 16 February 2016, grower with serious eye issues (the number of pigs with eye issues since the invasion of unconventional gas in now a regular occurrence, never witnessed before in George Bender's 68yrs of breeding pigs on 'Valencia'. Are you going to believe a farmer with 68yrs of experience, or an industry with limited experience and are in denial of the risks associated with their practices?)

The anatomy of a pig and a human are very similar; pigs are just proportionally smaller. So similar in fact that is it easier to list our differences. One of the major differences is the facial expression; pigs have bigger ears; they also have a visible tail, pigs also have different feet including the position and number of toes on their feet…that's about as far as our differences extend to.

Are you concerned?

APPENDIX C

Policy
ORG-PCMS-POL-003

Code of Conduct

The Code of Conduct is based on Origin's Purpose, Values and Commitments, and outlines how people within Origin are expected to behave. The board and senior executives of Origin are committed to this Code of Conduct in order to care for our business, people and reputation.

The purpose of this Code of conduct is to guide all directors, employees and other persons that act on behalf of the company, to perform their job in line with high ethical standards and applicable legal requirements.

Version:	2.1
Released:	July 2014
Document Owner:	Executive General Manager – People & Culture
Review Date:	July 2016

Please see document control section for more information

For internal Origin use and distribution only
Subject to employee confidentiality obligations
Once printed, this is an uncontrolled document

Contents

Our Purpose

We aspire always to lead.

We deliver today's energy needs, and we search and innovate to create tomorrow's energy solutions.

We honour our principles and values, and they are evident in all we do.

We live our commitments to our shareholders, to our customers, to our people, to our communities and to our business partners.

Origin's Principles, Values and Commitments

Origin expects all its directors, employees and other persons acting on behalf of the company, to conduct themselves in accordance with Origin's principles, values and commitments, and the policies that guide business conduct.

Principles

Origin's principles guide decisions that are right:

- We conduct ourselves and our business with **due care** and in accordance with relevant laws and regulations. We have an overriding duty to ensure the health and safety of our employees, and to minimise the health, safety and environmental impacts on our customers and the communities in which we operate.
- We will **add value** to the resources that come under our control.
- The value we create will be distributed to stakeholders recognising the need to ensure the **sustainability** of our business, and its impact on the environment and the communities in which we operate.
- We encourage **diversity** and expression of ideas and opinions but require **alignment** with the company's commitments, principles and values and the policies established to implement them.
- When faced with choices, we make decisions knowing they will be subject to **scrutiny**. We should be able to demonstrate the soundness of our decisions to all stakeholders.

Values

Origin's values describe behaviours that are good:

- **Caring:** We care about our impact on customers, colleagues, the community, environment and shareholders.

We will:

  - demonstrate concern for others and balance conflicting needs when making decisions
  - build a workplace environment that is open, rewarding, motivating and enjoyable
  - recognise and celebrate success and be proud of what we accomplish
  - treat others with respect
  - speak positively of others and provide positive feedback for good performance.
- **Listening:** We listen to the needs of others, knowing that an unfulfilled need creates the best opportunities.

We will:

- understand stakeholder needs in order to offer effective solutions
- be an effective and persuasive communicator
- explore the viewpoints and opinions of others, and encourage constructive debate
- create effective internal and external networks and relationships both with individuals and with teams
- actively seek feedback from others to promote enhanced performance.

- **Learning:** We constantly learn and implement new and better ways, sharing information and ideas effectively.

We will:

- proactively seek and share relevant information, focusing on the best overall outcome for Origin
- develop new ideas and initiatives that are practical, timely and relevant
- identify and analyse problems and opportunities to enable sound decisions to be made
- embrace change and negotiate obstacles effectively, challenging the status quo
- recognise that mistakes provide an opportunity to learn
- provide others with feedback to encourage their growth and development.

- **Delivering:** We deliver on the commitments made in all areas of performance.

We will:

- set high performance standards for ourselves and others, consistently and effectively meeting or exceeding these standards
- fulfil commitments, doing what is promised and in the time committed
- make good choices about priorities, picking the right things and doing them well, recognising that to not act is a decision in itself
- recognise opportunities for improvement and take personal ownership.

Commitments

Origin's commitments define the outcomes we strive to achieve. We commit to:

- Deliver market-leading performance for **shareholders** by identifying, developing, operating and growing value-creating businesses.
- Create value for our **customers**, by understanding their needs and delivering relevant and competitive energy solutions to meet those needs both today and into the future.
- Create a rewarding workplace for **our people** by valuing everyone's contribution, encouraging personal development, recognising good performance and fostering equality of opportunity.
- Respect the rights and interests of the **communities** in which we operate, by listening to them, understanding and managing the environmental, economic and social impacts of our activities.
- Respect the rights and interests of our **business partners**, by working collaboratively to create valued and rewarding partnerships.

Key Policies and Directives

Origin has adopted key policies and directives that govern business conduct and how employees, executives, directors, consultants and contractors must conduct themselves in the pursuit of company objectives.

These include but are not limited to:

- Diversity and Inclusion
- Discrimination, Harassment and Bullying
- Health, Safety and Environment
- Drugs and Alcohol
- Computer and Information Usage Directive
- Dealing in Securities
- Anti Bribery and Corruption (including Gifts and Hospitality)
- Conflicts of Interest
- Privacy
- Continuous Disclosure
- Competition and Consumer Protection

Reporting of serious concerns

Employees are encouraged to refer to company policies, or their supervisor or manager, if they have concerns about any conduct that may breach the law or Origin's policies. If in doing this an employee is not able to obtain a satisfactory response to their concern, or the concern is of a serious nature that could affect the whole company and its reputation, employees may report their concerns to a higher authority in accordance with the company's policy Dealing with a Serious Concern.

Employees who report any such concerns in good faith are protected from discrimination or other reprisals to the extent that the law permits.

Consequences of breaches of the Code of Conduct

Consistent with Origin's standard employment terms and conditions, Origin requires its employees to comply with all company policies including the Code of Conduct. Compliance will be monitored and any known or suspected instances of non-compliance will be reported to the relevant Executive Team Member for full investigation and appropriate disciplinary action. Confirmation of adherence to the Code of Conduct will also be sought via the Management Questionnaire.

Employees have on-line intranet access to the Code of Conduct and its constituent documents (Origin intranet home>manuals and policies>key documents>code of conduct). Employees must ensure they are familiar with all of the company's policies and complete the online Code of Conduct learning module within 30 days of joining Origin and every 2 years thereafter. See the Guide for Code of Conduct Training Requirements for further information.

A critical area of compliance is the company's Health, Safety & Environment Policy and supporting management system which require that employees maintain familiarity with and comply with all relevant safety regulations, codes of practice, standards, operating procedures and safety directions affecting their work and work areas.

Employees should also familiarise themselves with Origin's Dealing with a Serious Concern which details the arrangements in place to assist employees in reporting known or suspected instances of inappropriate conduct including Code of Conduct breaches.

A breach of company policy will result in disciplinary action and may result in summary dismissal. You should also be aware that some breaches could also result in civil or criminal action.

OUR HEALTH, SAFETY AND ENVIRONMENT POLICY

OUR PRINCIPLE OF DUE CARE

We care about the wellbeing of our people and our impact on the environment.

OUR HSE ASPIRATION

To conduct our business in a way that causes no harm to the health and safety of people and has no unforeseen impacts to the environment.

OUR HSE ACTIONS

We all believe that our HSE aspiration is achievable and we embrace our responsibility for supporting it by:

Always mindful of risk

Recognising that risk is present in every task we do and taking the time to identify and understand these risks and manage them safely and responsibly.

Enabled and accountable

Taking ownership and using our authority, resources, systems and competencies to manage the risks associated with our work. We stop work when confronted by an unknown hazard and proceed only when satisfied we can continue safely and responsibly.

Continuously learning

Being open and transparent about how well we are doing and relentless in learning from our experience to manage our risks. We work together effectively, welcome any feedback and recognise that we can always do better.

Our Compass and HSE Management System set out how we will implement this policy.

Grant King
Managing Director

ORG-HSE-POL-001 November 2014

Appendix D

The following extracts have been taken from Origin Energy's Health, Safety and Environment Policy. See Appendix C:

OUR PRINCIPLE OF DUE CARE

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To conduct our business in a way that causes no harm to the health and safety of people and has no unforeseen impacts to the environment.

Origin Energy's Policy ORG-PCMS-POL-003 – Code of Conduct extracts, see Appendix A for complete copy:

Code of Conduct

The Code of Conduct is based on Origin's Purpose, Values and Commitments, and outlines how people within Origin are expected to behave. The board and senior executives of Origin are committed to this Code of Conduct in order to care for our business, people and reputation.

The purpose of this Code of conduct is to guide all directors, employees and other persons that act on behalf of the company, to perform their job in line with high ethical standards and applicable legal requirements.

Our Purpose, page 3:

We live our commitments to our shareholders, to our customers, to our people, to our communities and to our business partners.

Origin Energy's Principles, Values and Commitments, page 3, 4 and 5:

Origin expects all its directors, employees and other persons acting on behalf of the company, to conduct themselves in accordance with Origin's principles, values and commitments, and the policies that guide business conduct.

Principles

Origin's principles guide decisions that are right:

- We conduct ourselves and our business with **due care** and in accordance with relevant laws and regulations. We have an overriding duty to ensure the health and safety of our employees, and to minimise the health, safety and environmental impacts on our customers and the communities in which we operate.

Values

Origin's values describe behaviours that are good:

- **Caring:** We care about our impact on customers, colleagues, the community, environment and shareholders.

We will:

  - demonstrate concern for others and balance conflicting needs when making decisions
  - build a workplace environment that is open, rewarding, motivating and enjoyable
  - recognise and celebrate success and be proud of what we accomplish
  - treat others with respect
  - speak positively of others and provide positive feedback for good performance.
- **Listening:** We listen to the needs of others, knowing that an unfulfilled need creates the best opportunities.

- **Delivering:** We deliver on the commitments made in all areas of performance.

We will:

  - set high performance standards for ourselves and others, consistently and effectively meeting or exceeding these standards
  - fulfil commitments, doing what is promised and in the time committed
  - make good choices about priorities, picking the right things and doing them well, recognising that to not act is a decision in itself
  - recognise opportunities for improvement and take personal ownership.

Commitments

Origin's commitments define the outcomes we strive to achieve. We commit to:

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- Conflicts of Interest
- Privacy
- Continuous Disclosure
- Competition and Consumer Protection

Appendix E

Psychiatric Injury - Symptoms

Stress caused by bullying results in these symptoms (and more):

- **main symptoms** - stress, anxiety, sleeplessness, fatigue (including Chronic Fatigue Syndrome - see below), trauma
- **physical symptoms** – reduced immunity to infection leading to frequent colds, coughs, flu, glandular fever, etc. (especially on days off, eg weekends and holidays), aches & pains (with no clear cause - this lack of attributability suggests stress as the cause - sometimes diagnosed as fibromyalgia), back pain, chest pains and angina, high blood pressure, headaches and migraines, sweating, palpitations, trembling, hormonal problems (disturbed menstrual cycle, dysmenorrhea, loss of libido, impotence), physical numbness (especially in toes, fingers, and lips), emotional numbness (including anhedonia, an inability to feel joy and love), irritable bowel syndrome or IBS [2], paresis (shy bladder syndrome)[3], thyroid problems, petit mal seizures, skin irritations and skin disorders (e.g. athlete's foot, eczema, psoriasis, shingles, internal and external ulcers, urticarial), loss of appetite (although a few people react by overeating), excessive or abnormal thirst, waking up more tired than when you went to bed, etc.
- **psychological symptoms** – panic attacks, reactive depression (which some people describe as Adjustment Disorder with depressed mood), thoughts of suicide, stress breakdown (this is a psychiatric injury, not a mental illness), forgetfulness, impoverished or intermittently functioning memory, poor concentration, flashbacks and **replays**, excessive guilt, disbelief, confusion, the bewilderment of "why me?", an unusual degree of fear, sense of isolation, insecurity, desperation, etc; one experiences acute anxiety at the prospect of meeting the bully or visiting the location where the bullying took place, or at the thought of touching the paperwork associated with the case; one is unable to attend disciplinary meetings and may vomit before, during or after the meeting, sometimes at the thought of the meeting or **on receiving a threatening letter** insisting one attends
- **behavioural symptoms** – tearfulness, irritability, angry outbursts, **obsessiveness** (the experience takes over your life), hypervigilance (feels like but is not paranoia), hypersensitivity (almost every remark or action is perceived as critical even when it is not), sullenness (a sign the inner psyche has been damaged), mood swings, withdrawal, indecision, loss of humour, hyperawareness (acute awareness of time, seasons, distance travelled), excessive biting, teeth grinding, picking, scratching or tics, increased reliance on drugs (tannin, caffeine, nicotine, alcohol, sleeping tablets, tranquillisers, antidepressants, other substances), comfort spending (and consequent financial problems), phobias (especially agoraphobia), etc.
- **effects on personality** – shattered self-confidence and self-esteem, low self-image, loss of self-worth and self-love.

Other symptoms and disorders reported include sleep disorder, bipolar disorder, mood disorder, eating disorder, anxiety disorder, panic disorder, skin disorder.

Table of Differences between Mental Illness and Psychiatric Injury:

Mental Illness	Psychiatric Injury
• the cause often cannot be identified	• the cause is easily identifiable and verifiable, but denied by those who are accountable
• the person may be incoherent or what they say doesn't make sense	• the person is often articulate but prevented from articulation by being traumatised
• the person may appear to be obsessed	• the person is obsessive, especially in relation to identifying the cause of their injury and both dealing with the cause and effecting their recovery
• the person is oblivious to their behaviour and the effect it has on others	• the person is in a state of acute self-awareness and aware of their state, but often unable to explain it
• the depression is a clinical or endogenous depression	• the depression is reactive; the chemistry is different to endogenous depression

Mental Illness	Psychiatric Injury
• there may be a history of depression in the family	• there is very often *no* history of depression in the individual or their family
• the person has usually exhibited mental health problems before	• often there is *no* history of mental health problems
• may respond inappropriately to the needs and concerns of others	• responds empathically to the needs and concerns of others, *despite* their own injury
• displays a certitude about themselves, their circumstances and their actions	• is often highly skeptical about their condition and circumstances and is in a state of disbelief and bewilderment which they will easily and often articulate ("I can't believe this is happening to me" and "Why me?")
• may suffer a persecution complex	• may experience an unusually heightened sense of vulnerability to possible victimisation (ie hypervigilance)
• suicidal thoughts are the result of despair, dejection and hopelessness	• suicidal thoughts are often a logical and carefully thought-out solution or conclusion
• exhibits despair	• is driven by the anger of injustice
• often doesn't look forward to each new day	• looks forward to each new day as an opportunity to fight for justice
• is often ready to give in or admit defeat	• refuses to be beaten, refuses to give up

APPENDIX F

Tuesday 7 January, 2014 4:48 PM

From: [redacted]
Date:
To:
Cc:
Attach: [redacted] to Origin 7-01-2014.pdf
Subject: Origin

Hi George,

Thank you for your email.

Over the break we received the **attached** response from Origin.

You will note that Origin's response still fails to provide an amount solely for compensation, although they do state that they wish to discuss the proposed make good measures with you.

The general tone of the response indicates that they wish to "cut us out of the picture" and negotiate directly with you in relation to the make good measures. Given the importance of this agreement to your property and the future use that can be made of the property, we would consider it prudent to have legal input throughout the negotiation. As we understand matters, you are of a similar view.

In line with your previous instructions, we have prepared the **attached** response to Origin's letter. Could you please consider its content carefully, particularly in relation to Bore RN26063, and contact our office to provide your instructions.

We look forward to hearing from you.

Kind Regards,

Lachlan Brimblecombe | Law Clerk

[redacted]4405
PO Box 667, Dalby QLD 4405
13 11 99 SHINE.COM.AU

SHINE LAWYERS
RIGHT WRONG.

From: [redacted]
Sent:
To: La
Subject: bender

Hi Lachlan

Has Origin responsed to any of the Make Good Agreement emails?

Letter received from Ian Heiner stating that their are two bores in the Walloons, I feel Origin should be making good on two affected bores.

Could you please confirm where we are at and time frame as I would like this to happen before we talk about placements gas wells with Origin.

Talks have starting with Grant Higgs from Origin re wells but has been told that the Make Good Agreement needs to happen first.

Thanks

George

APPENDIX G

From: [redacted]
Date: [redacted]
To: [redacted]
Attach: [redacted]ap.pdf
Subject: [redacted]out

George & Pam,

Origin would like to complete the scouting of your property for the decommissioning of the bores as described in your Make Good Agreement on 29 November 2014. It will involve up to 10 persons scouting the access tracks and areas surrounding the bores. I have attached a map defining the areas to be scouted.

It would be appreciated if you could confirm access on this day is OK.

Thanks

Grant

Grant Higgs
Senior Landowner Relations Advisor
Origin
t 07 4672 6622 [redacted]

APPENDIX H

Memorandum *[redacted]*

From	*[redacted]*	Date	2 December 2014
Subject	DA1669 Scouting survey near miss		

Critical Issues

- Scout Supervisor didn't have adequate weed cert plan
- Incorrect information was relayed to the LO (use & number of cars)
- Communication between LRA & scout supervisor about the meeting time was not understood (must be 11.30 as opposed to 11.30-12)
- 13 people attended in 6 cars (PAR745 only stated 10 people & 6 cars)

Actions *[names of action holders redacted]*

- Review with the scout team the Weed Hygiene policy
- Establish the correct lines of communication between team & PM's [Project Managers]
- Revisit with scout team the required level of preparation that is required for a successful scout
- Discussion with group around the level of detail & checks required on all of our actions
- Communicate to teams that for any non essential personal (including training new staff) must have sign off from Superintendents to attend
- Review the need for full scout teams and if actions can be delayed to activities commence i.e. desk top environmental assessment and CH clearance at time of disturbance

Lessons

- When the pre scout is conducted the correct FSG staff member should be in attendance so they can sign off on the site, eliminating the requirement of a scout in many cases
- Scout supervisor should also be in attendance to comprehensibly cover the data capture/mapping & to represent the remainder of teams
- Higher degree of Gate 1 review to determine if a scout is required, requirement for scout to be challenged

[Added 23 November 2015
Further lessons incorporated into current approach

- *Share detailed plans for work, who will execute, where and when with Landholder. Keep Landholders informed of changes to the plan, and the rationale for those changes;*
- *So long as the work is safe and effective to execute, take Landholder preferences into account;*
- *Most importantly, follow through on what we have committed.]*

APPENDIX I

Origin energy

30377201

9 January 2007

George and Pam Bender

[redacted]

Dear George and Pam

I understand following discussions with our landowner rep Lindsay Horn that you still have some concerns regarding any future development that may occur on your property by Origin Energy following the seismic program.

As mentioned in our correspondence Origin does value your input and we do listen to our landowners. Therefore we have again addressed your concerns in this letter. However, I must again emphasise that the proposed seismic program, for which we are currently seeking your agreement on compensation, is a separate activity which in itself will have minimal, if any, impact and has no compensatory relationship with any potential future exploration and or development. If and when exploration and or development occur they will be subject to separate compensation agreements which will be developed in conjunction with yourselves to ensure a fair and workable outcome for both parties. I will now respond to your other questions below:

- The receipt of our original letter indicating Origin would not need to cross your property for the program: As previously mentioned this was an unfortunate and unintended situation. Origin had intended to avoid Chinta but during the initial site visit it became apparent the chosen route was not viable, necessitating the change of route onto Chinta. This was explained to you as soon as it became known.

- The issue of the letter sent by myself regarding our commitment to avoid cultivation if any exploration drilling was necessary: This is still Origin's intention and we stand by our word. As explained during our phone conversation the letter was written with a contingency in case your area of cultivation changed subsequent to the agreement being made and Origin found itself unable to pursue an exploration program on Chinta through that commitment. However, based on your comments that you do not intend to increase the area of cultivation on Chinta we are happy to amend the letter as follows:

  - Amendment to letter sent on 12 December 2006 from O Hobbs (The remaining commitments and comments made in that letter stand):

    'If any Exploration drilling is required on Chinta, Origin commits to avoiding current areas of cultivation as delineated in the 2001\2 aerial photography (referred to as GIS-F-140-0008-1.36 and GIS-F-140-0008-1.37)

Origin Energy CSG Limited ABN 68 001 646 331 • Ground Floor, South Tower, 339 Coronation Drive, Milton, Qld, 4064 • GPO Box 148, Brisbane, Qld, 4001 • Telephone (07) 3858 0600 • Facsimile (07) 3369 7840 • www.originenergy.com.au

and which were used to define the routes for our current seismic program. These same maps were presented to you with our entry notice'.

- In terms of the time you and Pam have spent with OE representatives on this issue we will add a further $500 to the compensation amount to cover this.

- The $2000 legal fee offer is only if you choose to have the agreement interpreted by a solicitor.

- Access to Petroleum Act 1923: This legislation can be found on the following web site http://www.legislation.qld.gov.au , however, please note this Activity is covered by the Petroleum and Gas (Production and Safety) Act 2004.

- Origin will pay the agreed compensation amount as soon as possible on commencement of the seismic program.

- Discussions concerning any specific concerns regarding drilling activities can only occur if and when drilling is required. We will be more than happy at that time to discuss your concerns at length. Again it needs to be emphasised that the seismic program and any other future activities are separate activities and must be compensated for separately and considered separately.

George, we understand your concerns and have tried to address them as much as is possible. As both Bill Hundy and I have stated, we can only continue to emphasise that Origin has a commitment to work with you to develop agreeable and workable outcomes at all stages of our activities. However, our seismic program commences next week and as you would appreciate we can't delay this program any longer as the equipment is scheduled for other operations, therefore we need to have agreed and signed compensation in place by the end of this week. If we can't come to a suitable agreement we may have no option but to proceed to the Land and Resources Tribunal, who will assist in deciding compensation outcomes while allowing us to continue the program. However, this is a last resort for Origin and we would prefer to resolve this outside the LRT.

Our exploration landowner representative will be visiting Chinta again on Friday with a view to picking up the signed compensation agreement for the seismic. I would really appreciate your co-operation.

If you have any questions please call me.

Yours sincerely

O Hobbs
Queensland Operations Manager

[redacted]

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Orana Seismic Survey

- Well
- Cadastre
- Proposed seismic

500m

Horizontal Datum = GDA 94
Projection = MGA Zone 56

Map Reliability

Proposed infrastructure subject to change without notificaion, exercise caution when using this data.

Data Sources

Uncontrolled copy (TDL)
Printed: 24/10/2006

Map ID: GIS-F-140-0008-1.37

Origin energy

Orana Seismic Survey

- Weli
- Cadastre
- Proposed seismic

500m

Horizontal Datum = GDA 94
Projection = MGA Zone 56

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