fracking inquiry

From: Territoryfun [redacted]
Sent: Wednesday, 14 February 2018 8:29 AM
To: fracking inquiry
Subject: Draft Final Report Submission
Attachments: PCass Submission - NT Fracking Inquiry's Draft Final Report.docx

Dear Justice Pepper and Panel,

Please find my submission attached and consider it when producing your final report.

Kind regards,

Pauline Cass

Submission to the NT Fracking Inquiry's Draft Final Report

Dear Justice Pepper and Inquiry Panel,

Thank you for all your work in this Inquiry. It is appreciated, and the draft Final Report is extensive in its coverage of the risks and issues associated with hydraulic fracturing in the Northern Territory. I am astounded however, that the draft report concludes that the onshore shale gas industry can operate safely if properly regulated, given the weight of evidence to the contrary. I am concerned that the Panel has given too much weight to the say-so of gas industry, while under valuing the many experts, scientists, health professionals, economists, and well researched laypeople who have presented and submitted evidence of the risks posed by the onshore shale gas industry. The risks can not be mitigated to an acceptable level with regulation, as any risk to our water, climate or health is unacceptable.

I was also dismayed that the body of the draft Final Report made no mention of the strong opposition Territorians have towards fracking. It has been abundantly evident at all the forums that no social licence exists. APPEA have said this is because only people against fracking go to forums, but if anyone supported fracking, surely they would attend too? The truth is there is no support for fracking, except by those few (often short-term new-comers) who seek to profit at the expense of Territorians. The CSIRO report on Territorians' acceptance of extractive industries is not a measure of fracking acceptance. I, like many of my friends, support many extractive industries, but totally oppose fracking for being too risky.

I have gone through the chapters and added my comments, corrections to errors, and suggestions below. I have also listed, assessed and commented on all the recommendations at the end of this submission (Appendix 1).

Thank you for taking the time to read and consider them,

Yours Sincerely,

Pauline Cass

Chapter 1 Purpose of the Inquiry

1.3 The purpose of the Inquiry

"They require the Panel to assess and determine:

- *the nature and extent of the risks associated with hydraulic fracturing of onshore unconventional shale reservoirs and its associated activities on the environmental (aquatic, terrestrial and atmospheric), social, cultural, and economic conditions of the Northern Territory;*
- *whether these risks can be mitigated to an acceptable level; " (p. 10)*

The draft Final Report has been unable to fully assess and determine all the risks due to the lack of data available, meaning that the level of risk mitigation is unknown and therefore unacceptable, as any level of risk to water, climate, air or health is unacceptable.

Chapter 2 Work of the Inquiry to date

I commend you on your extensive work to date. However, I am concerned that the Inquiry has given far too much weight to what the industry says rather than the extensive, in-depth research provided by the well informed public and independent experts.

Chapter 3 Summary of discussions at community forums and the final list of issues

I would like to raise your awareness to divisive social issues created by gas negotiations. I implore you to watch the video of how the CLC conducts their 'consultations' embedded in this report: https://www.welcometocountry.org/land-council-locks-elders-out-meetings/

I wish to reiterate my disappointment that the community's efforts to have their opposition to fracking heard have not been stated in the draft report (mentioning it in the summary is not good enough). I also think you have failed to grasp the difficulty people experience in attending forums and consultations due to time and travel constraints and work or family commitments.

I further wish to raise the issue of some people and organisations' inability to participate in the Inquiry due to fear of losing their jobs, contracts or funding. I know that the Inquiry offered an anonymous submission option and prevented recordings at forums to address this, but the fear of reprisal kept these people silenced. For an example, please see the NT News article (Sunday Territorian, Gag Orders Hide the Truth, 14 January 2018) below:

NT Weekend

OPINION 07

Why can't we let public servants speak freely on their expertise?

HAYLEY SORENSEN

Gag orders hide the truth

IT'S a scene that plays out at least once a week in the Smith St Mall.

A sweaty and frazzled journalist puts on her most charming smile.

But she has been standing out there for 20 minutes by now, so it's less charming and more crazed.

She approaches the friendliest face she can spot. On the other side of this street poll is a cold drink and an end to the demoralising rejection.

"Hithereimajournalistfromthentnewsandiwaswonderingifyoucouldansweroutquestionoftheday."

Halfway through the question, she realised it was hopeless. The glint of light shining from a lanyard hanging from the target's waist has answered it more succinctly than words could.

"I can't, I work for the government," the terrified public servant squeaks. Desperation now.

"But it's just about what your favourite ice cream flavour is," the journalist cries. "It's nothing to do with the government."

The public servant explains they've been expressly forbidden from revealing any opinion on dairy products. Any questions about ice cream preferences must first go through the departmental media team and a response will be emailed back through by the end of the week, attributable to a genderless, nameless spokesperson.

The public servant scarpers, fearing she's already said too much. If she's lucky, she'll be sacked. A beheading is more likely.

I was once told the Department of Parks and Wildlife was unable to allow me to speak to a ranger about the wisdom or otherwise of swimming in front of baited crocodile traps because the appropriate bureaucrat who needed to give permission wasn't in the office.

Of course the ranger was at work and possessed vocal cords.

But without that sign off from a superior in an office in Darwin, he was muzzled.

Why can't we allow our public servants to speak freely on their area of expertise without having to jump through bureaucratic hoops?

A Government-employed scientist who has spent his life researching toads can't offer a professional opinion on toad-related matters without approval. For some reason, the media managers reckon they need to be involved lest some sort of anti-government toad opinions leak through.

I've been rewatching the West Wing. One of the most unbelievable aspects — other than the idea of having a legitimately mentally stable genius in the Oval Office — is the freedom given to government employees to speak about whatever they please. Staffers give interviews and make television appearances.

The difference is the US's first amendment. We don't have a constitutionally-enshrined freedom of expression in Australia. It's "implied" apparently. But that implication is faded. In 2014, Commonwealth public servants were encouraged to dob in colleagues who posted material on social media critical of the government — regardless of whether it was posted in a personal or even anonymous capacity.

Liking, sharing or failing to delete critical comments from others can be seen in the eyes of the public service as an endorsement of that material.

It's draconian and unnecessary.

Australia is one of the few countries in the Asia-Pacific region to have a free press, and supposedly, freedom of expression. We should be leading the way, and setting an example for others in our region.

In reality, we have more in common with our geographic neighbours than we care to believe.

Cast of the US smash hit drama The West Wing Picture: KAT MURPHY

TERRITORY CHIEF MINISTER MICHAEL GUNNER ON A NEW PUSH FOR AUSTRALIA TO BREAK AWAY FROM THE ENGLISH MONARCHY

OUTBACK WRANGLER MATT WRIGHT AFTER HIS LOYAL DO[G] PASSED AWAY

Chapter 4 Evidence and risk assessment methodology

"Regulatory reform (chapter 14) is considered by the Panel to be a mitigating factor rather than a risk requiring assessment. That is, if regulation is robust in content and is effectively implemented, it should reduce the risks posed by the development of any onshore shale gas industry to an acceptable level." (p. 28)

I suggest that regulations and regulatory reform also be assessed as a risk, as the NT Government has shown repeatedly that it is unable to implement, monitor compliance, enforce, or penalise regulatory infringements. I am also concerned that regulations and recommendations will be watered down or not implemented due to pressure from the gas industry and Federal Government. Regulatory capture is an undeniable risk in the NT.

"In other words, a mitigation measure, or measures, was required to be implemented to prevent a possible unacceptable impact from occurring unless it could be proven by the acquisition of additional information that the risk did not require the original prescribed level of mitigation." (p. 29).

There is a vast difference between mitigating and eliminating. I can not emphasise strongly enough that any risk to water is unacceptable. All life, industry and economy is totally dependent on our water.

"For risks that were initially assessed as unacceptable (namely, 'M' or 'H'), the Panel has identified measures that, if implemented, will potentially further reduce the 'likelihood' or 'consequence' of the risk so that the reassessed residual, or remaining, risk will meet the environmental objective and be acceptable. Such measures could include increased and/or more rigorous monitoring, improved compliance, more efficient regulation, improved enforcement, or the implementation of world leading practice guidelines." (p.32)

As stated earlier, it is highly doubtful that stringent guidelines and regulations will be implemented or enforced, and "potentially further reduce" is not acceptable, nor is risks to water, air, climate or health.

Risks unable to be assessed from: Appendix 3 Risk assessment matrix (p. 15 Appendices)

These risks from the matrix must be fully assessed and determined before any exploration can recommence.

Not able to be determined

Environmental value 1: water quantity

Excessive extraction from groundwater - regional impacts – Southern Beetaloo Sub-basin

Environmental value 2: surface and groundwater quality

Unacceptable surface and groundwater contamination due to offsite spills of hydraulic fracturing chemicals and wastewater from road and rail transport

Unacceptable groundwater contamination due to offsite leaks of hydraulic fracturing chemicals and wastewater from pipelines

Unacceptable contamination of groundwater aquifers due to reinjection of treated or untreated wastewater into other aquifers

Undetermined

Environmental value 3: aquatic ecosystems and biodiversity

Excessive extraction from groundwaters - for subterranean ecosystems

Unacceptable contamination of groundwaters (groundwater dependent ecosystems)

Unknown

Environmental objective 2: to assess and manage human health risks associated with the specific chemicals used in, or likely to result from, hydraulic fracturing processes

Unacceptable human health effects caused by hydraulic fracturing and geogenic chemicals in flowback water – for geogenic chemicals

Low to Medium

Environmental objective 3: to ensure human health risks associated with airborne emissions from gas wells and associated infrastructure are acceptable

Unacceptable impacts on the health of nearby communities from dusts and/or diesel exhaust fumes from shale gas site preparation activities

Environmental value 2: landscape amenity

Unacceptable increase in heavy-vehicle traffic

My Recommendations

1. Continue the hydraulic fracturing moratorium until the risks to our surface waters and groundwaters have been fully understood, and SREBA and baseline testing has been conducted.

The risks posed by hydraulic fracturing to our surface and ground waters have been identified in the report, but the Panel have been unable to determine the level of risk or how to fully mitigate them.

2. Baseline testing/monitoring and SREBAs must be conducted before exploration, not production as suggested in the risk matrix (for threatened species and traffic as well as water, air).

3. Decommissioned wells need ongoing monitoring indefinitely (Recommendation 5.1 needs expanding).

Chapter 5 Shale Gas extraction and development

5.1.1 Occurrence of conventional and unconventional gas

Correction: *" 'unconventional' gas is found in relatively impermeable source rocks" (p. 36)* - CSG is not always trapped by/under impermeable layer.

Correction: There is no such thing as "impermeable source rocks", geologically speaking, they are less permeable source rocks.

5.2.1 History

Correction: (p. 37) Shale gas not currently in commercial production in the UK. A 5 year moratorium was called after fracking caused earthquakes[1]. The moratorium has now been lifted despite strong public opposition, but no commercial production has commenced.

Correction: *"the first commercially producing unconventional gas"* (p. 37) well was CSG in 1996 near Moura, Qld (https://industry.gov.au/Office-of-the-Chief-Economist/Publications/Documents/coal-seam-gas/Socioeconomic-impacts-of-coal-seam-gas-in-Queensland.pdf).

Correction: (p. 37) Santos is not commercially producing shale gas (2016, Santos Annual Report https://www.santos.com/media/3525/san675_annualreport2016_fa3_low-res_.pdf) and likely won't for years (http://www.theaustralian.com.au/business/mining-energy/shale-gas-success-still-a-decade-away-for-australia-says-santos/news-story/70fb6480ebd5459e494a4502daf775f4). There "is currently no commercial production of shale gas in Australia" (p. 76).

5.2.2 Stages of exploration and development

Exploration drilling (stages 2,3 & 4) still require drilling through aquifers, land clearing and chemical use. (p. 38). It is for this reason that all recommendations, SREBA's, and regulatory changes must be conducted and implemented prior to any recommencement of exploratory activities.

5.3.2.3 Hydraulic fracturing

Correction: *"Most shale gas wells are designed to keep producing hydrocarbons for decades."* (p. 44). This is an exaggeration. Shale gas wells have a rapid rate of decline which limits the well's productive life. Production levels are maintained by drilling more wells. Please read: *New well-productivity data provide US shale potential insights*[2].

Unidentified risk: Sand Use. Where will it come from? Sand mining causes terrible land degradation. Origin stated that they used "2.5 million lbs of proppant"[3] in the Amungee NW-1H well. This equates to 1,133,980.93 kilograms of sand.

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[1] http://www.earthquakes.bgs.ac.uk/research/FrackingInducedSeismicity.html

[2] Sandrea & Sandrea, 2014, New well-productivity data provide US shale potential insights, http://www.ogj.com/articles/print/volume-112/issue-11/drilling-production/new-well-productivity-data-provide-us-shale-potential-insights.html

[3] Origin Energy Submission #283, p. 5 https://frackinginquiry.nt.gov.au/submission-library?a=452658

The draft report does not acknowledge the large amounts of chemicals used in hydraulic fracturing, eg. "small percentage of chemical additives (typically less than 1%)" and Figure 5.5 (p. 42). It would be beneficial to include some sample figures, such as X tons of chemicals were used in the hydraulic fracturing of the Amungee well.

"after hydraulic fracturing is complete, a portion of the hydraulic fracturing fluid, or flowback, will flow out of the wellbore and return to the surface (typically 10-30% of the initial hydraulic fluid)" (p. 44). This means that 90 – 70% of fracturing fluid remains permanently underground. I consider this a possible future risk which may not be recognized as such for decades. It needs assessing but there is no existing data.

"The number of fracture stages in a single well has increased over time in US unconventional gas fields. For example, in 2009, 10-12 fracturing stages would have been typical, with a spacing of around 200 m. While in 2017, it is common for 40-100 fracture stages in a single lateral, with a spacing of around 15-30 m between segments that are being fractured." (p. 42), and "Wells may also need to be hydraulically re-fractured to extend their production lifetime" (p. 44). This means that fracking will use more water than previously reported, thus further risking our water reserves in already heavily allocated or slow to recharge aquifers. Recycling of the flowback water is not a solution as only 10-30% of fluid flows back (p. 44).

5.3.2.5 Well decommissioning and abandonment

"In common with operating wells, leakage or failure of abandoned wells could occur via poorly cemented casing/hole annuli, faults in the interface between cement and the formation rock and casing failure additionally, for abandoned wells, the interface between cement plugs and casing has been identified as a preferential pathway for fluid flow migration of fluid can also occur through fractures, channels, and the pore space in the cement sheath. In the latter case, fluid flow will only occur when the cement sheath is degraded or does not form properly during the cementing process" (p. 46). There is also the risk of contaminants migrating upwards through the fractured rock strata and naturally occurring fissures in the over burden to aquifers above.

"The panel has found that there is a paucity of information available on the performance of abandoned onshore shale wells" (p. 47). This is of extreme concern! The lack data showing long-term well safety makes onshore shale gas extraction totally unacceptable.

"When asked about the long-term pressure behaviour of wells after they are plugged and abandoned, Halliburton, one of the largest service providers worldwide to the shale gas industry, responded that pressures are not monitored post abandonment and that there is no statistically based data available to indicate the percentage of wells that fail. Halliburton continued, "based on reported MIT failure rates in active wells, the percentage should be very low and may be less than 1%" (p. 47). This is not scientific evidence of well safety, it does not even qualify as anecdotal evidence. It is purely guess work and should be given no credence what so ever and be removed from the final report.

Current well abandonment regulations (the Schedule of Onshore Petroleum Exploration and Production Requirements 2016) were found to be lacking by the Panel (p. 48). The Inquiry's recommendations on well abandonment must be strengthened and they must be implemented by government (see Appendix 1).

Panel recommendations for long term well monitoring (Recommendations 5.1, 5.2, 5.3) either do not go far enough or do not cover abandoned wells. Eg. Recommendation 5.3 – "an ongoing program of integrity testing be established for each well during its operational life. For example, every two years initially for a period of 10 years and then at five-yearly intervals thereafter to ensure that if any issues develop they are detected early and remediated" (See Appendix 1 for further discussion).

5.4.2 Failure modes for well integrity

5.4.2.1 Failure mechanisms related to drilling, 5.4.2.2 Failure mechanisms related to casing, and 5.4.2.3 Failure mechanisms related to cement (p. 51) identify failure modes for well integrity, but do not discuss integrity after abandonment.

5.4.2.4 Long-term stability and integrity of cement

The panel concluded that if onshore shale gas wells are properly designed, installed and maintained, the risk of long-term leakage from the wells through degradation of the cement will be low (p. 53). This conclusion is based on modelling and laboratory experiments which may not be indicative of reality.

There is no such thing as an impermeable layer, only less permeable.

Permeability is increased by drilling and fracturing thousands of wells.

5.4.2.5 Potential impact of hydraulic fracturing on well integrity

"The high pressures experienced during fracturing can damage the well casing and lead to the escape of fluids" (p. 53). We have already witnessed how the one shale gas well drilled and fracked in the Beetaloo suffered a deformity (not shown in the diagram on p. 81). As this well was drilled to 'best practice' specifications, one must ask, is 'best practice' safe enough when thousands of wells will be drilled?

5.5.2 Management of well integrity in the NT

Page 58 describes the current inadequate processes and legislation for drilling activities and hydraulic fracturing in the NT. I totally agree, but consider the government and gas industry unable and unwilling to improve processes or legislation. The gas industry will especially resist any regulatory changes which though crucial for protecting Territorians, might cost them money.

5.7.1 Wastewater production

Correction: *"20-50% of the volume of the initially injected water is returned to the surface as flowback water" (p. 62).* Earlier the draft report said *"10-30% of the initial hydraulic fluid" (p. 44).* Which is correct?

5.7.3 Composition of flowback and produced water

Very limited data *"has limited the capacity for meaningful risk assessments of flowback/produced waters to be undertaken" (p. 64).* This is of great concern as we need to know the risks, especially considering the management of potentially radioactive wastes will need to be planned prior to any further fracking being conducted (exploratory or production).

5.8.2 Treatment and reuse

"The panel notes that there is currently no industrial wastewater receiving, treatment or disposal facility in the NT" (p. 66). This must be addressed prior to any exploratory or production fracking can occur. Any facility must be able to dispose of the water treatment by-products such as salts and radioactive materials.

5.8.4 Wastewater management incidents

"There is significant potential for accidental releases, leaks and spills of hydraulic fracturing chemicals and fluids, and flowback and produced water that could lead to contamination of nearby surface water and seepage through the soil profile into shallow aquifers" (p. 68). This is of extreme concern to Territorians, especially considering our past experiences with PFAS and a plethora of mines. We had a truck load of sulphuric acid spill near Pine Creek just last Saturday which resulted in the Kakadu Highway being closed to traffic (3/2/2018, in true NT cover-up style, no report has been found).

5.9 Solid waste management

"the disposal of the large amounts of drill cuttings produced by a full-scale industry is the cause of concern given the nature of this material and its potential to leach organic and inorganic components into the near surface environment" (p. 67). Thus making the draft report's suggestion of using it as a road base seem ludicrous. Where will this solid waste be stored or treated? How will it be kept safe?

5.10.1 Seismicity induced by hydraulic fracturing

Correction: *"it is extremely rare for hydraulic fracturing stimulation to result in earthquakes of sufficient scale (richter scale magnitude 2.0 or greater) to be felt locally" (p. 70).* New studies dispute this. Please read: 'Seismicity During the Initial Stages of the Guy-Greenbrier, Arkansas, Earthquake Sequence'[4], 'Fracking Activity Linked to Increase in Texas Quakes, According to New Study'[5] and 'Fault activation by hydraulic fracturing in western Canada'[6].

[4] 'Seismicity During the Initial Stages of the Guy-Greenbrier, Arkansas, Earthquake Sequence' http://onlinelibrary.wiley.com/doi/10.1002/2017JB014946/full

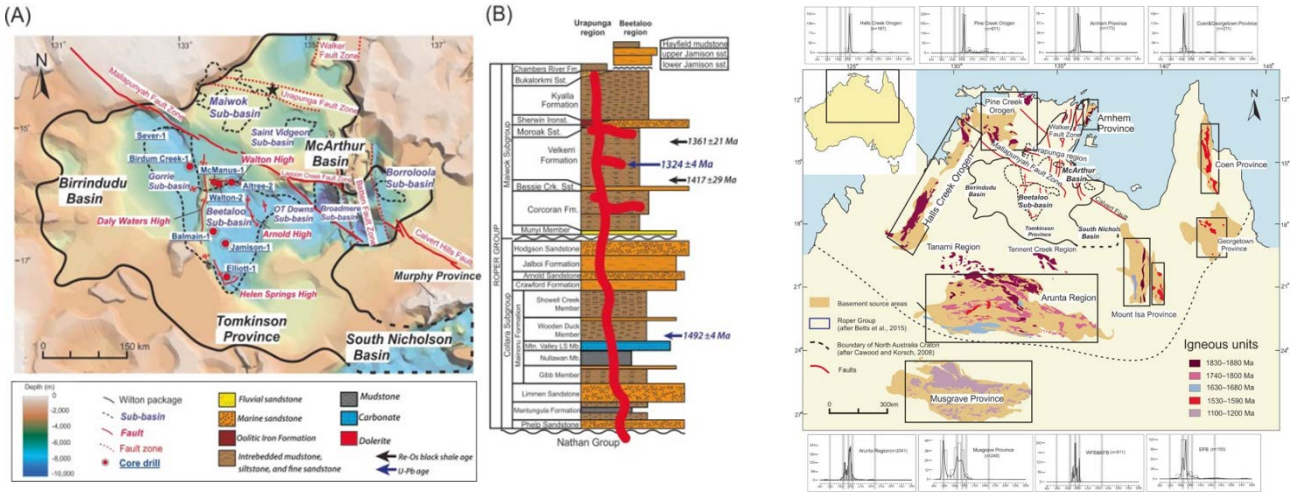
[5] 'Fracking Activity Linked to Increase in Texas Quakes, According to New Study' http://e360.yale.edu/digest/fracking-linked-to-increase-in-texas-quakes-according-to-new-study

[6] 'Fault activation by hydraulic fracturing in western Canada' http://science.sciencemag.org/content/354/6318/1406

Correction: "In its submission, DPIR states that there is no evidence to suggest that the hydraulic fracturing process can produce measurable earthquakes in areas that do not contain susceptible faults" (p.70). Faults, fractures and fissures exist everywhere throughout the Earth. There is no such thing as solid rock and it is impossible to map all the smaller fissures with current technology, which is how the Amungee well was drilled through a fault.

There have been several new seismicity reports published recently:

This new study by NT Geological Survey, Department of Primary Industry and Resources, SANTOS Ltd and The University of Adelaide, shows the major faults in the Beetaloo Sub-basin: 'Spatial and temporal variation in detrital zircon age provenance of the hydrocarbon-bearing upper Roper Group, Beetaloo Sub-basin, Northern Territory, Australia'[7]. See images from the report below:



New Stanford study confirms fracking causes earthquakes[8]

"That was a surprise," said co-author Gregory Beroza, "It had been thought, and we thought, that early earthquakes in this area were related to wastewater injection. But we found that the majority were caused by fracking."

"We were particularly surprised by the size and persistence of the seismicity," co-author Bill Ellsworth said.

"We want to encourage continuous seismic monitoring before fracking operations start, while they're in progress and after they've finished," Beroza said.

Read published scientific report here: http://onlinelibrary.wiley.com/doi/10.1002/2017JB014946/full

Another new report finding hydraulic fracturing causes earthquakes is:

'Discriminating between natural versus induced seismicity from long-term deformation history of intraplate faults', by Maria Beatrice Magnani, Michael L. Blanpied, Heather R. Deshon, Matthew J. Hornbach (a team of geologists from Southern Methodist University in Dallas and the U.S. Geological Survey), published in *Science Advances,* 24 Nov 2017: Vol. 3, no. 11.[9]

[7] 'Spatial and temporal variation in detrital zircon age provenance of the hydrocarbon-bearing upper Roper Group, Beetaloo Sub-basin, Northern Territory, Australia' http://www.sciencedirect.com/science/article/pii/S0301926817303613#b0125

[8] https://news.stanford.edu/2017/12/12/small-earthquakes-fracking-sites-may-indicate-bigger-tremors-come/

[9] http://advances.sciencemag.org/content/3/11/e1701593.full

The McArthur Basin contains the Batten Fault Zone (p. 78), and the Beetaloo Sub-basin contains the Daly Waters Fault Zone between Larrimah and Elliott (p. 79), but in reality microfaults exist everywhere. Fracking in fault zones have been proven to cause earthquakes. Fault zones must be declared 'no go areas'.

Recommendations must also apply to exploration wells, as they also cause seismic activity and earthquakes when fracked[10].

Appendix to Chapter 5 (in book of Appendices):

CSIRO Report into the shale gas well life cycle and well integrity

The CSIRO report states, *"There has been limited development of onshore gas resources in the Northern Territory; therefore, there is currently a lack of data for well integrity hazard identification and risk assessment" (p. 66, Appendices).* Using the data and knowledge gained from elsewhere, it is safe to say that well integrity poses great risks.

My Recommendations

There is little difference between exploration and production. Exploration drilling (stages 2,3 & 4) still require drilling through aquifers, and chemical use (p. 38).

1. Moratorium to remain in place for exploration and production drilling.

2. Moratorium should remain until well integrity after abandonment is understood.

3. Moratorium should remain until the Schedule of Onshore Petroleum Exploration and Production Requirements 2016 is clarified and consistent and Inquiry recommendations have been adopted into legislation. Regulations should be the same for exploration and production wells.

4. Panel recommendations for long term well monitoring (Recommendations 5.1, 5.2, 5.3) either do not go far enough or do not cover abandoned wells and must be extended.

Chapter 6 Onshore shale gas in Australia and the Northern Territory

The *"Northern Territory's petroleum bearing basins are relatively underexplored, and as a result, the level of geological knowledge of the basins is incomplete and highly variable" (p. 76).* This means that assessments conducted in one area of a basin will not necessarily be suitable for another part of the same basin or other basins. Each well location will need to be assessed individually as well as regionally.

6.2 Exploration for and development of unconventional gas in Australia

There *"is currently no commercial production of shale gas in Australia"* (p. 76), this is because it was found to be commercially unviable when attempted in the Cooper Basin, SA.

[10] http://www.earthquakes.bgs.ac.uk/research/FrackingInducedSeismicity.html

Since 2016, *"there has been a moratorium on hydraulic fracturing in the Northern Territory, NSW, and WA and a legislative ban in Victoria" (p. 76).* This is due to the known risks and dangers posed by fracking and the onshore gas industry as a whole, and Australians' refusal to accept these risks. These risks have been considered unacceptable and resulted in bans in many parts of the world.

6.3 Shale gas potential of the Northern Territory

"The Batten Fault Zone within the McArthur Basin, west of Borroloola, has attracted serious attention since 2010 as a potential gas province" (p. 78) – fracking in fault zones can cause earthquakes and must be banned.

The Beetaloo Sub-basin of the McArthur Basin, contains the Daly Waters Fault Zone between Larrimah and Elliott (p. 79) – fracking in fault zones can cause earthquakes and must be banned.

"Other basins in the Northern Territory have possible shale gas potential but limited geological information" (p. 82). These basins need to be assessed and have SREBA's completed prior to their exploration to identify 'no go' areas and site-specific risks, with both individual well site assessments and regional assessments.

6.4 Likely areas of shale gas development in the Northern Territory

"Amadeus Basin is the only onshore basin in the Northern Territory with identified reserves and existing petroleum production infrastructure" (p. 85). Any new gas discoveries here *"could technically be brought on stream within 12 months".* But not before proper baseline testing and site assessments have been conducted and the Panel's recommendations have been adopted and legislated to protect Territorians' water, air, climate and health. The onshore shale gas industry should be banned from operating in the NT due to its many and potentially catastrophic risks, so any allowance for it to occur must have the correct mitigating measures in place prior to commencement.

The Panel considers it *"unlikely that there will be any shale gas production in the Beetaloo Sub-basin in less than three years" (p.85),* though theoretically exploration can resume once the moratorium is lifted under the current regulations. These regulations must be upgraded to include the Inquiry's recommendations prior to the recommencement of any further exploratory fracking.

6.5 Possible development scenarios in the Northern Territory

There is wide discrepancy in shale development scenarios, depending on which report you read. The Frogtec[11] report for ACOLA states that 15,506 shale gas wells could be fracked in the McArthur Basin, which is much greater than the 1,200 wells proposed by the gas industry in the draft report. One thing which concerns Territorians is that the Beetaloo Sub-basin is the 'thin edge of the wedge' and once gas companies have their foot in the door, they will attempt to do as they please and destroy our landscape, amenity and way of life (as well as our water).

[11] Frogtech 2013, 'Potential Geological Risks Associated with Shale Gas Production in Australia', ACOLA, https://www.acola.org.au/PDF/SAF06FINAL/Frogtech_Shale_Gas_Geology_and_Risks%20Jan2013.pdf

The owners of Beetaloo Station have been told that Origin wants to cover the entire station with a grid of 1km squares with a well at each junction. Origin also told them that they then plan to in-fill the grid so the station will be covered by wells 500m apart. This is similar to what Origin has told the owners of Nutwood Downs Station.

6.5.1 Scale of development

"The scale of development is difficult to establish at the current time" (p. 86).

Industry estimates *"the combined developments over the next 25 years could result in between 1,000 and 1,200 wells associated with around 150 well pads"* (p. 86), while the *"Energy Division of DPIR predicts … possibly around 6,250 wells in the Beetaloo Sub-basin*" (p. 86). The DPIR estimation is more accurate than the industry's due to the rapid gas production decline rate in shale gas wells necessitating the constant drilling of new wells.

In terms of well density, *"There is currently insufficient information available for any of the onshore shale gas basins in the Northern Territory to inform this long-term planning issue" (p. 87).* However, strict restrictions must be mandated to prevent the NT from becoming a patchwork of new and abandoned wells as seen in photos of the USA gas fields and Queensland's CSG fields.

6.5.2 Rate of development

"ACOLA also estimated that one drilling rig could produce between 11 and 18 wells per year" (p. 87). The Panel thinks this figure is optimistic, however once full production begins, new drill rigs are acquired and new staff are imported, this is totally possible.

6.5.3 Infrastructure needs

"Establishment of a full scale shale gas industry in the Northern Territory will require the drilling of thousands of wells, the construction of thousands of kilometres of roads and access tracks, the clearing of vegetation from well pads, accommodation facilities, production facilities, and pipelines for transporting the gas. This level of construction will have flow-on impacts to regional populations, towns and Darwin itself. There will be demands for heavy vehicles, plant and equipment, drilling rigs, hydraulic fracturing units and temporary accommodation, as is the case with any major construction" (p. 87). As we have experienced with other major projects such as Inpex, this brings an influx of cashed-up single men, impacts local employers who struggle to retain staff due to their wanting higher paid jobs on the project, deteriorates our roads, and creates an abundance of other problems and issues for locals. This temporary boom (which is a struggle for locals), is always followed by a bust that leaves many people worse off.

The draft report under-estimates water use, quoting the following water use estimates by gas companies: Origin will use "Large approx. 1,200 ML/y for 25 years = 30,000 ML (or 30 GL)4" of water in the Beetaloo Sub-basin (p. 86); Santos will use "Approx. 200-400 ML/y for 30 years = 6,000-12,000 ML (or 11 GL)" in the McArthur and Beetaloo Sub-basin; Pangaea will use "600-900 ML/y for 7 years = 4,200-6,300 ML (or 4-6 GL)" in the Beetaloo Sub-basin (p. 86). However, in their submission, Origin

state that they used a "total pumped fluid volume of ~11 ML"[12] to hydraulically fracture the Amungee NW-1H well, which only fractured a relatively short lateral distance.

My Recommendations

1. The McArthur Basin contains the Batten Fault Zone (p. 78), and the Beetaloo Sub-basin contains the Daly Waters Fault Zone between Larrimah and Elliott (p. 79). Fracking in fault zones can cause earthquakes. Fault zones must be declared 'no go areas'.

2. Recalculate the estimated amount of water to be used, based on Origin's water use to frack the Amungee NW-1H well.

Chapter 7 Water

"it is apparent that available knowledge and data on the NT's water resources (surface and groundwater), and their associated aquatic ecosystems, is presently insufficient to permit the risks associated with the development of any onshore shale gas industry in the NT to be assessed without considerable uncertainty" (p. 112).

7.1 Introduction

"The sustainable management of surface and groundwater resources will be crucial to the development of any onshore unconventional shale gas industry in the Northern Territory. Sustainable development involves the protection of three water-related environmental values: water quantity, water quality, and aquatic ecosystems. The protection of these values will be realised by achieving the following three objectives. First, to ensure surface and groundwater resources are used sustainably. Second, to maintain acceptable quality of surface and groundwaters. And third, to adequately protect ecosystems that are dependent on surface water or groundwater. Water-related risks were the central concern raised in submissions received by the Panel and during the community consultations" (p. 90) – I absolutely agree with this statement.

The fact that "*20 risks to water supply, water quality, and aquatic ecosystems" (p. 90)* were identified is concerning, especially considering the *"paucity of information about regional surface water and groundwater processes in other regions of shale gas prospectivity in the NT" (p. 90*), and *"The implications of climate change for groundwater processes and recharge rates are also unclear at this stage" (p. 91).* No onshore shale gas exploration or production should be permitted to commence until the NT's water processes are understood. This is crucial as contamination or depletion in one area can impact a water source in a distant location, eg. the CLA flows north from the Beetaloo to discharge into rivers and springs hundreds of kilometres away.

[12] Close, et al 2017, 'Proterozoic shale gas plays in the Beetaloo Basin and the Amungee NW-1H discovery', p. 94, https://frackinginquiry.nt.gov.au/submission-library?a=456133

7.2.1 Surface water resources

Using Satellite imagery does not show the little springs and spring fed streams hidden by the bush, eg. Figure 7.2. (p. 93). I have heard of small springs in the Northern Beetaloo area which are part of 'secret men's business' so not openly discussed (I'm not meant to know of their existence and do not know their location) and question if they would show up in satellite imagery.

Temporary waterbodies are vital to the survival of many species and must be declared 'no go zones', especially considering *"very little is known about the aquatic ecology of the temporary streams and waterbodies in the semi-arid and arid regions of the NT" (p. 93).*

7.2.2 Groundwater resources

"Groundwater accounts for 90% of all of the NT consumptive water supplies" (p. 96), making any risk to our groundwater absolutely unacceptable.

The fact that Beetaloo's *"groundwater resources have … important knowledge gaps" (p. 107)* and for *"all potential onshore shale gas areas in the NT, there is very little information about the nature of the deeper groundwater systems, and moreover, there is limited understanding (based on deep exploration drilling to date) of the deeper geological systems in these basins" (p. 100),* makes any shale gas activities unacceptable until these knowledge gaps have been filled and the risks to our groundwater from fracking is deemed to be manageable to an acceptable level. It can not be assumed that there is limited interchange between the shale and aquifers or between different aquifers and underground streams.

"Figure 7.4: Cambrian Limestone Aquifer overlying the three main Basins (Daly, Wiso, and Georgina) and the Beetaloo Sub-basin. Source: DENR" (p. 99), shows that groundwater flows north from the Beetaloo Sub-basin area and discharges in the Daly, Katherine and Roper rivers, these will be affected if the aquifers become contaminated or depleted. This in turn will impact tourism, fishing, crop irrigation, cattle watering and down-stream ecosystems.

7.2.3 Aquatic ecosystems and biodiversity

"There is limited understanding of the aquatic ecology of the temporary streams and waterbodies that dominate the semi-arid and arid regions of Australia, or the environmental flows required to maintain most of Australia's tropical rivers in good ecological health" (p. 101), these must be understood, risks to both immediate and down-stream ecocsytems must be assessed, and areas of high ecological importance identified and declared 'no go' zones, prior to commencement of any onshore gas activities. Areas which sustain down-stream ecosystems must also be declared 'no go' zones. This is why conducting SREBAs must occur prior to exploration fracking.

7.2.4 Water use and management

Correction: The Katherine River is also used for a town water supply and tourism so should be added to the list on p. 103.

7.2.4.1 Water Act

"Many high yielding aquifers within the NT are close to full allocation against the prescribed contingent allocations. Groundwater and surface water resources in a number of specific areas such as Alice Springs, Darwin Rural, Douglas Daly, Katherine and Mataranka are recognised as being under pressure from resource development" (p. 105). Extraction of water from these aquifers for fracking must be banned to protect the people, industries and ecosystems already dependent on these water supplies.

7.2.4.2 Application of the Water Act to petroleum activities

I fully agree that *"the Water Act should be amended to require shale gas companies to acquire and pay for water licences for their activities" (p. 105).* This will help prevent over extraction by the gas industry and help protect existing water users and the environment.

7.2.4.4 EPBC Act

"Currently, the water trigger in the EPBC Act does not apply to shale gas developments despite water resources clearly being of environmental significance to these developments" (p. 106). The Inquiry could recommend that the NT Government lobby the Federal Government to amend the EPBC Act to include shale gas.

7.3 Likely water requirements of any onshore shale gas industry in the NT

The draft report under-estimates water use, quoting the following water use estimates by gas companies: Origin will use "Large approx. 1,200 ML/y for 25 years = 30,000 ML (or 30 GL)4" of water in the Beetaloo Sub-basin (p. 86); Santos will use "Approx. 200-400 ML/y for 30 years = 6,000-12,000 ML (or 11 GL)" in the McArthur and Beetaloo Sub-basin; Pangaea will use "600-900 ML/y for 7 years = 4,200-6,300 ML (or 4-6 GL)" in the Beetaloo Sub-basin (p. 86). However, in their submission, Origin state that they used a "total pumped fluid volume of ~11 ML"[13] to hydraulically fracture the Amungee NW-1H well, which only fractured a relatively short lateral distance. This poses a risk of aquifer depletion, considering many aquifers are almost fully allocated and *"it is likely that groundwater will be the main water resource available for any onshore shale gas developments" (p. 106).*

Correction: "It is increasingly common practice for proponents to recycle as much of the flowback fluid from the hydraulic fracturing operations as possible. This can comprise up to 30-80% of the water requirements for the operation" (p. 107). How is this possible when "typically 10-30% of the initial hydraulic fluid" (p. 44) or "20-50% of the volume of the initially injected water is returned to the surface" (p. 62). These figures don't add up!

[13] Close, et al 2017, 'Proterozoic shale gas plays in the Beetaloo Basin and the Amungee NW-1H discovery', p. 94, https://frackinginquiry.nt.gov.au/submission-library?a=456133

7.3.1 Beetaloo Sub-basin case study

"Figure 7.7 (b): Geological cross section from Mataranka to south of Daly Waters of the Cambrian Limestone Aquifer, showing the Tindall Limestone, the Gum Ridge Formation and the Anthony Lagoon Formation" (p. 108) contains many question marks. Where is the constant impermeable layer?

Imperial Oil and Gas and Hancock Prospecting have already stated want to frack outside the current Beetaloo Sub-basin boundary arguing *"that the boundary marked on Figure 6.2 is arbitrary and that additional drilling is likely to show the shale resource extending further to the north" (p. 109).* Allowing hydraulic fracturing to occur in the Beetaloo Sub-basin will open up all of the Northern Territory basins to fracking.

7.3.1.2 Surface water

I provided the Panel with several storm and flood warnings for the Beetaloo area during my presentation at the final round of hearings in Darwin. They do not fit the 1:100 year flood diagram in Figure 7.8 on page 111. Many creeks flow through the Beetaloo Sub-Basin (p. 109 & 110) which are also prone to flooding in the wet season.

I agree that *"the Panel has very little information on the location, hydrological characteristics and ecology of temporary waterbodies more broadly in the Beetaloo Sub-basin, and has recommended that this information be obtained as part of a SREBA" (p. 112).* The SREBA must be conducted prior to exploration so that floods can be planned for and these water bodies can be declared 'no go' areas.

7.3.1.3 Groundwater

"There is limited information about the groundwater systems in rocks underlying the CLA and their connectivity with this groundwater system" (p. 112), which is why conducting SREBAs and declaring 'no go' areas is crucial prior to any water extraction or exploration fracking occurring. This is especially essential considering there is "*An estimated 800 registered water bores in the Beetaloo Sub-basin" and "This aquifer also provides domestic water for several Communities, including Elliott, Newcastle Waters, Daly Waters and Larrimah … Mataranka and Katherine" (p. 112).* People, industries and ecosystems can not exist without access to groundwater.

Groundwater processes

"Details of the processes controlling recharge of the majority of the CLA are poorly known" (p. 113) and must be understood to protect the NT's most valuable resource… water.

The CSIRO is being paid by Santos and Origin to undertake *"regional and local scale studies to improve understanding of recharge mechanisms and total aquifer storage and sustainable yield in the Beetaloo region" (p. 114).* The fact that the study is being paid for by gas companies may make some people sceptical of the results. In order to mitigate this scepticism, funding for research should be paid by gas companies into a government trust which is then used to pay independent scientific bodies (such as a separate new government research department or a university) for studies.

Groundwater dependent ecosystems

"There is insufficient information concerning GDEs in the Beetaloo Sub-basin or elsewhere in the NT" (p. 115), "Given the karstic nature of the landscape, the Panel's view is that there is considerable likelihood of groundwater dependent (including stygofauna) or groundwater influenced ecosystems associated with springs, sinkholes, caves and preferential groundwater flow pathways in the Beetaloo Sub-basin. Such groundwater dependent ecosystems are likely to be susceptible to excessive groundwater use and any contamination from shale gas hydraulic fracturing operations" (p. 115). The moratorium on hydarualic fracturing should continue until these GDE's, water processes and the risks to GDE's are fully understood.

7.3.1.4 Possible development scenarios

"Origin, Santos and Pangaea" estimate they'll use "a total of 20,000-60,000 ML from the aquifer system over the 25 years" (p. 115). DPIR estimates *"125,000 ML of water over the 40 years" (p. 116).* Both figures factor in water recycling to reduce the amount of water. Yet this submission has already stated that the figures don't add up (see my comments for 7.3).

7.4 Assessment of water-related risks

Correction: *Table 7.5: Acceptability criteria adopted for the water-related risks* disregards other water users, by allowing the full water extraction allocation (20% of flow/yield) to be used by the gas companies (p. 117)

The Panel says *"low likelihood"* is an acceptable risk (Table 7.5, p. 117), but any water-related risk is considered unacceptable by Territorians.

7.4.2 Example environment risk assessments

Both Santos and Origin submitted sample risk assessments, and both were found lacking by the Panel (p. 118). An acceptable risk assessment must assess all possible risks including direct and indirect, localised, regional and down-stream risks, risks to people, industry and environment, and include all aspects of gas activities.

7.4.3 Strategic regional environmental and baseline assessment (SREBA)

The moratorium must continue as *"it is apparent that available knowledge and data on the NT's water resources (surface and groundwater), and their associated aquatic ecosystems, is presently insufficient to permit the risks associated with the development of any onshore shale gas industry in the NT to be assessed without considerable uncertainty" (p. 120).*

"These SREBAs should focus on providing a baseline understanding of the surface and groundwater resources, hydrogeology, aquatic ecosystems and terrestrial ecosystems using data that is representative of the geographic, climatic, and hydrogeological characteristics of any prospective basin, and an assessment of the vulnerability of these systems to any hydrological changes associated with any onshore shale gas development. This vulnerability assessment will require the

development of regional groundwater and surface water models of sufficient complexity to be able to predict the effects of water abstraction by the industry on availability of water for human, agricultural and pastoral, and environmental needs" (p. 120) – Yes, SREBAs must be conducted prior to lifting the moratorium on hydraulic fracturing in the NT.

7.5 Water quantity

"There is considerable concern in the community that any onshore shale gas development in the Territory will use greater volumes of groundwater than can be sustained without causing adverse effects on groundwater levels both locally and regionally. As noted previously, it is unlikely that adequate reliable surface water resources exist in the Beetaloo Sub-basin, or other prospective regions of the NT" (p. 120). This is why SREBAs must be conducted and gas activities must be included in the Water Act prior to any resumption of fracking.

7.5.1 Unsustainable use of surface water

I agree with *"the Panel's view is that the use of surface water resources for hydraulic fracturing should be prohibited" (p. 121).*

7.5.2 Unsustainable use of groundwater

7.5.2.1 Regional impacts

"Origin suggests that it will require 50-60 ML for drilling and stimulation per well" (p. 122), though the Panel says this might increase as techniques change.

In the southern part of the Beetaloo sub-*basin "the extraction of 5,000 ML/y may well represent unsustainable use of the groundwater resource. This may also be the case in other arid and semiarid prospective basins in the NT" (p. 122). "For the southern Beetaloo Sub-basin, and other semi-arid to arid regions, the Panel's view is that groundwater extraction for shale gas production should be prohibited until the groundwater resource is better understood" (p. 123).* I agree, as water is too essential to risk depletion or contamination.

"Panel considers that it is unlikely that an onshore unconventional gas industry will use an unacceptably high amount of groundwater in the northern part of Beetaloo Sub-basin" (p. 122), "but notes that there is considerable uncertainty associated with this assessment" (p. 123). This makes this assessment result unacceptable. Data must be obtained and a proper risk assessment conducted before any hydraulic fracturing can resume.

7.5.4 Unacceptable changes to surface or groundwater flow due to possible seismic activity caused by reinjection of wastewater

The Panel recommends that *"reinjection of wastewater into deep aquifers and conventional reservoirs should be prohibited until comprehensive geotechnical investigations are undertaken to show that no seismic activity will occur" (p. 126).* Reinjection has been cited as the cause of induced seismic activity in numerous reports, so I agree with the prohibition of reinjection.

7.8 Conclusion

However, the Panel has identified four high priority issues from the 20 assessed, in respect of which there is insufficient information to enable a full risk assessment to be conducted. These are: sustainable groundwater use; contamination of groundwater with hydraulic fracturing fluids and wastewater from leaky wells; groundwater contamination from on-site surface spills of wastewater; and the effect of these water quantity and quality issues on either surface and/or groundwater dependent ecosystems.

The Panel has determined that detailed SREBAs are needed to provide the necessary data and knowledge. The Beetaloo Sub-basin should be the first priority for such a SREBA, and this must be undertaken before any production licences are granted for the purpose of any onshore shale gas industry in the NT (p. 152). The lack of data, hence the lack of proof that the risks can be mitigated to an acceptable level, is grounds for a continuation of the moratorium. No fracking, whether exploratory or production, should be approved until such time as it can be irrefutably shown to be safe to an acceptable level, bearing in mind that Territorians firmly reject any threats to our water, and consider risks to water unacceptable.

My Recommendations

1. The Panel found the Beetaloo Sub-basin "has been comparatively well studied", and a "paucity of information about regional surface water and groundwater processes in other regions of shale gas prospectivity in the NT" (p. 90). Fracking must be banned until the water processes are fully studied and understood in all regions of the NT, including Beetaloo Sub-basin.

2. "The implications of climate change for groundwater processes and recharge rates are also unclear at this stage" (p. 91). The moratorium must continue until the impacts of climate change on water is fully understood.

3. "Figure 7.1: Average annual rainfall in the Northern Territory over the period 1960-1990. Source: BOM" (p. 92). Fracking must be banned until current and future rainfall amounts are fully understood, especially considering our changing climate.

4. "With all potential onshore shale gas areas in the NT, there is very little information about the nature of the deeper groundwater systems, and moreover, there is limited understanding (based on deep exploration drilling to date) of the deeper geological systems in these basins" (p. 100), also Figure 7.7(b) on page 108 shows "important Knowledge gaps" (p.107). Fracking must be banned until the NT's groundwater systems are fully understood.

5. Aquatic ecosystems and biodiversity are of international significance and must be fully understood before fracking can resume.

6. Panel's recommendation (7.1) to amend the Water Act needs to be extended to include exploration licences as well as production licences.

7. The Panel says "low likelihood" is an acceptable risk ("Table 7.5, p. 117). Any water-related risk is unacceptable, especially with the lack of data.

Chapter 8 Land

8.2.2 Terrestrial biodiversity

DENR has provided the Panel with information on terrestrial biodiversity in the Beetaloo and Southern Georgina Sub-basins … The vertebrate fauna includes 17 "threatened" species" (p. 155-156). A search of the NT Government's 'Threatened animals' webpage[14] found 19 threated species listed which occur in the Beetaloo region, though there may be more that I missed or that are yet to be discovered.

8.2.3 Bioregions

The Sturt Plateau Bioregion has been ear marked for future horticultural development, so should be declared a 'no go' zone.

The Stuart Plateau is a major water catchment area, recharging aquifers and feeding springs and rivers many kilometres away.

I agree that "areas of high conservation significance that are not part of the reserve network" need to be declared 'no go' zones and protected for future generations.

8.3 Infrastructure needs of any onshore shale gas industry in the NT

I have been told in confidence (by a source I trust) that Origin is planning to create a grid of well pads 1km apart over Beetaloo Station, then infill the grid, meaning that well pads will be 500m apart. If correct, then Figure 8.5 on page 165 of the draft report does not reflect what Origin has been telling landholders in the Beetaloo Basin. I suggest that the Inquiry contact the owner of Beetaloo Station to confirm what he has been told.

8.3.2.1 Roads

Roads divert water flow, and must be properly designed to avoid creating erosion.

The gas industry requires thousands of vehicle trips per well (p. 189) which greatly degrades road surfaces, costing thousands of dollars per well to maintain[15]. These maintenance costs must be borne by the gas industry for the roads they use.

The increase in traffic due to gas activities has led to increased traffic accidents in American gasfields. There are countless newspaper reports documenting this.

The increased traffic also poses a significant risk to wildlife with road kill being of great concern.

[14] https://nt.gov.au/environment/animals/threatened-animals
[15] https://stateimpact.npr.org/pennsylvania/2014/03/27/report-finds-each-marcellus-gas-well-costs-thousands-in-road-damage/

8.3.2.3 Pipelines

It must be ensured that pipelines do not impact water flow or create erosion. There have been anecdotal reports and photos on social media of buried pipelines subsiding or becoming boggy after rain and trapping animals (cattle), so regular monitoring of their surface impact is important.

8.4 Biodiversity and ecosystem health

Biodiversity and ecosystem health is so vital, that internationally the Rio Declaration sought to protect it, Agenda 21 sought to define the Principles of ESD, and the Federal Government created the EPBC Act. Onshore shale gas extraction / hydraulic fracturing is in direct contravention of these international agreements and principles. Fracking threatens inter-generational equity and goes against the original intention of the precautionary principle.

"The Panel's assessment is that the likelihood of onshore shale gas development occurring in currently undocumented areas of high conservation value in the NT is 'high', given the lack of comprehensive and systematic information on the biodiversity assets of prospective regions,92 including virtually no information on invertebrate fauna. This poses a significant threat to species that might occupy highly restricted ranges within a development area, and therefore, the consequence is also rated as 'high'. Combining the likelihood ('high') and consequence ('high') gives an overall risk rating of 'high'" (p. 172). The moratorium must remain and exploration can not continue until the SREBAs have been completed. The risks to potentially undocumented endangered species from land clearing for seismic lines, etc is too great.

The SREBAs must be conducted by an independent body. Perhaps a fund can be created with industry money to finance an branch of the NT Parks and Wildlife department (they were prolific in discovering and describing species and published many books and papers in the 1980s-90s), or a pool of independent surveyors can be created and randomly assigned to conduct SREBAs. I fear if interested parties conduct SREBAs, they will not accurately report what they find.

8.4.2 Unacceptable increases in the spread or impacts of invasive species

8.4.2.1 Weeds

All methods of weed transference should be inspected for and mitigated, including seeds being transferred on vehicle tyres[16], soles of footwear, and in clothing, especially socks. The spread of cathead prickles (Caltrop) along the Stuart Highway rest areas over the past few years has been alarming, with these painful prickles now in areas where they never existed before. Caltrop is declared a Class B and Class C weed in the NT[17] and is one likely to be spread by gas activities.

[16] Photo of Caltrop weed in tyre http://www.northwestweeds.com.au/images-library/images-burrs/
[17] https://denr.nt.gov.au/__data/assets/pdf_file/0010/407449/Caltrop-ID-sheet-2017.pdf

8.4.3 Unacceptable changes to fire regimes

Who will be responsible for extinguishing fires started by gas activities? There are no fire brigades in remote areas, and landholders can not be expected to leave their duties to fight fires started by gas activites/employees.

Will flaring be banned on total fire ban days in the NT?

If prescribed fires are required who will manage them? Ranger uranium mine recently burnt fire sensitive areas and almost destroyed ancient rock art in Kakadu National Park when a strategic burn at the mine site got out of control.

Will landholders be compensated if crops or fodder is destroyed by a gas industry fire?

What about burnt wildlife treatment and rehabilitation?

8.4.6 Other unacceptable impacts on wildlife

Over looked risk: Flaring – Birds, bats and flying invertebrates are attracted to and incinerated by flares at night. Wildcare has received call outs to the flare at Darwin Harbour to collect burnt birds and bats. In Canada 7,500 migrating birds, some endangered species, were burnt to death by a single flare in one night[18]. This is not acceptable.

8.5 Landscape amenity

The Northern Territory relies heavily on the economic benefits our landscape amenity generates through both our tourism industry and our image as a clean, green food producer.

8.5.2 Unacceptable increase in heavy-vehicle traffic

"requiring heavy vehicles to travel at night" (p. 190) is absolutely not acceptable due to the risks it poses to wildlife. Most of the NT's wildlife is nocturnal or crepuscular, so would be at extreme risk of becoming road kill. This can considerably impact population numbers considering the amount of traffic proposed.

8.6 The need for the strategic development of any onshore shale gas industry

The majority of Territorians state that there is no need for any development of any onshore shale gas industry, strategic or otherwise. This has been clearly demonstrated at rallies, in media polls, and during the Inquiry process. An ad hoc development would be even worse than a strategic one.

[18] Company pleads guilty in death of 7,500 birds that flew into gas flare https://www.ctvnews.ca/business/company-pleads-guilty-in-death-of-7-500-birds-that-flew-into-gas-flare-1.2644803

Chapter 9 Greenhouse gas emissions

Chapter 10 Health

"Natural gas production related activities result in emissions of methane, smog-forming volatile organic compounds and NO_x, as well as air toxics including BTEX group, formaldehyde, and hydrogen sulfide. Emissions come from normal operations, routine maintenance, system upsets and fugitive leaks. Incremental air emissions from shale gas development, as opposed to conventional gas development, occur during the completion process, in which new and re-stimulated hydraulically fractured gas wells are prepared for production"[19]

Dr Geralyn McCarron published 'Air Pollution and human health hazards: a compilation of air toxins acknowledged by the gas industry in Queensland's Darling Downs.' on 8 January 2018[20]. The report concludes: "Increased cardiopulmonary hospitalisations are coincident with the rise in pollutants known to cause such symptoms. Apparently, controls to limit exposure are ineffectual. The burden of air pollution from the gas industry on the wellbeing of the Darling Downs population is a significant public health concern."

Chapter 11 Aboriginal people and their culture

Correction: Recommendation 11.4 (p. 263) should read "under s46 of the Land Rights Act[21]."

If you didn't watch the video in my comments for Chapter 3 of the draft report, please watch the video now. https://www.welcometocountry.org/land-council-locks-elders-out-meetings/

Please read: 'Hancock hits back at shale challengers' which describes 'consultation' with TOs. http://www.energynewsbulletin.net/exploration/news/1100768/hancock-hits-back-at-shale-challengers

Also please read: 'Traditional Owners fight fracking approvals at Mataranka, NT' and listen to the recording in the article http://caama.com.au/news/2016/traditional-owners-fight-fracking-approvals-at-mataranka-nt

You can hear a CAAMA report on the Coffey consultations for the Inquiry here: http://caama.com.au/news/2017/the-latest-caamas-update-from-the-current-community-consultation-meetings-about-fracking

Chapter 12 Social impacts

This chapter makes no mention of all the opposition to fracking shown at consultations or in polls conducted by NT media. It does show "Number of submissions emphasising risks and benefits

[19] GFZ German Research Centre for Geosciences, Shale Gas Information Platform http://www.shale-gas-information-platform.org/categories/operations/the-basics/
[20] http://www.tandfonline.com/doi/full/10.1080/00207233.2017.1413221
[21] https://www.legislation.gov.au/Details/C2013C00556

relating to social impacts" in Figure 12.1 (p. 270), but little emphasis is placed on the fact that the majority of submissions emphasised the risks not benefits.

The draft report uses a CSIRO study examining people's trust and acceptance of the extractive industries to imply acceptance of onshore shale gas extraction (p. 287). This is misleading as many people who oppose fracking say they work in and support other extractive industries when I talk to them at stalls. It is surprising how many miners and Inpex workers have signed my petition to ban fracking.

I took great exception to the term "FIFO Activists" (p. 280) being used in the draft report, especially as it was printed in bold lettering. I have never encountered any FIFO activists in all my years of campaigning to ban fracking. We did have 2 farmers (and their wives) from Victoria join us for our Water is Life Rally in November 2017, but I would hardly call 2 elderly farmers FIFO Activists.

Chapter 13 Economic impacts

The ACIL Allen report found, in the 'most likely' scenario that NT shale gas will be uneconomic to extract, and therefore create few jobs and less royalties. This makes onshore shale gas a high risk, low return industry.

The first page of the ACIL Allen report says: "All economic modelling is subject to uncertainty, and should be treated with caution. ACIL Allen Consulting ('ACIL Allen') considers the modelling presented in this report is subject to higher than usual uncertainty".

The ACIL Allen report failed to consider many economic impacts on the Territory such as:

The cost to the NT economy of dealing with long term impacts of contamination. Aquifers can not be decontaminated once contaminated.

The impacts on existing sustainable industries like tourism and farming which depend on reliable, uncontaminated water sources and provide employment to Territorians.

The cost of job losses in existing industries if they are impacted and businesses close due to fracking.

As for jobs created by onshore shale gas, the report shows even if fracking was to proceed, there would be less than half of a per cent extra jobs created each year in the Territory, and most of these would be for FIFO workers from other parts of Australia or overseas.

Fracking is not the financial boon for the Territory that gas companies would like us to believe, with the consequences far exceeding any perceived gain. For example, Queensland has 6000 gas wells and 3 export terminals, yet Treasury received just $36 mil last year in royalties, but nobody is counting the cost to that State's farmland, and depleted water. Fracking needs to be banned to give certainty back to landholders and communities in the Territory.

At the Inquiry hearings in Katherine on 7 February 2018, we heard the Katherine Mining Services Association's Public Officer, Teresa Cummings, tell us that 2 people are currently employed to monitor 4 sites, 2 people slash the sites, 2 people spray weeds at the sites, and 2 people respond to emergencies at the sites, as if several people are employed. I suspect the same 2 people are employed on a casual basis to do all these things, besides jobs such as slashing and weed spraying

only need to be done a few times a wet season, if they can get a slasher there through the boggy, flooded roads.

Chapter 14 Regulatory reform

Regulatory reforms must be enacted prior to any lifting of the moratorium and prior to any recommencement of exploration. As the draft report states, our current regulations are inadequate to manage the many risks associated with the onshore shale gas industry, and this must be rectified to protect Territorians before any further gas activities are allowed.

The Northern Territory Government's STRIKE website needs drastic improvement. It is almost impossible for the average Territorian to access information from this site.

I most vehemently disagree with the Inquiry's finding that *"Pastoralists should not have a statutory right of veto" (p. 349)*. How can landholders have any certainty about their future if they don't have the right to protect their businesses and property from fracking?

Regarding independent monitoring, we have an independent monitor for the McArthur River Mine. This hasn't stopped reactive iron sulphide rock on the mine's waste dump from burning for three years[22], or zinc and lead from the dump contaminating local waterways. The only true protection from the risks of fracking is to ban it.

Please see my comments in Appendix 1 regarding the Inquiry's recommendations.

Chapter 15 Strategic regional environmental and baseline assessment

SREBAs must be conducted prior to the lifting of the moratorium on hydraulic fracturing and before any onshore shale gas activities resume. This is so we can identify 'no go' areas, areas of high biodiversity or other conservational significance, areas of horticultural or pastoral significance, and areas where flooding or water allocation may be an issue.

Another compelling reason to conduct baseline testing prior to exploration is that exploratory fracking and other activities such as clearing seismic lines, may alter the baseline data gathered if they were to occur prior to or simultaneously with the baseline data collection.

[22] https://www.theguardian.com/environment/2017/dec/21/thousands-of-tonnes-of-dangerous-mining-waste-dumped-in-wrong-place

Appendix 1. NT Fracking Inquiry Draft Final Report Recommendations

I have assessed the recommendations made throughout the report. My comments and recommended alterations are below:

Legend:
Blue Highlight – Brilliant / Must be adopted
Green Highlight – Good / Accept
Yellow Highlight – Needs strengthening
Red Highlight – Bad / Reject
Grey Highlight - Unsure

Recommendation 5.1 (p. 48)

That the Government mandate a code of practice setting out minimum requirements for the abandonment of onshore shale gas wells in the NT. The code must be enforceable and include a requirement that:

- wells undergo pressure and cement integrity tests prior to abandonment, with any identified defects to be repaired prior to releasing the well for decommissioning; and
- testing must be conducted to confirm that the plugs have been properly set in the well.

(Comment/Addition – wells must have an ongoing management and monitoring plan for after abandonment)

Recommendation 5.2 (p. 48)

That the Government mandate a program for the ongoing monitoring of abandoned shale gas wells in the NT. The program must include the ongoing monitoring of water quality by bores installed adjacent to the well and the results of such monitoring to be published in real-time.
(Comment – Monitoring must also be conducted for methane emissions. Questions - How often will monitoring occur? How long-term will the monitoring be? Monitoring must be conducted infinitely)

Recommendation 5.3 (p. 57)

That in consultation with industry and other stakeholders, the Government develop and mandate an enforceable code of practice setting out the minimum requirements that must be met to ensure the integrity of onshore shale gas wells in the NT. This code must require that:

- all onshore shale gas wells (including exploration wells constructed for the purposes of production testing) be constructed to at least a Category 9 (or equivalent) standard, with cementing extending up to at least the shallowest problematic hydrocarbon-bearing, organic carbon rich or saline aquifer zone; (Comment - cement must extend up to the surface (p. 55))
- all wells be fully tested for integrity before and after hydraulic fracturing and the results be independently certified, with the immediate remediation of identified issues required;

(Comment – must specify testing between fracture stages for resulting loss of integrity, seismicity and deformations[23])

• an ongoing program of integrity testing be established for each well during its operational life. For example, every two years initially for a period of 10 years and then at five-yearly intervals thereafter to ensure that if any issues develop they are detected early and remediated; and
(Comment – wells should be continuously monitored and tested throughout their existence. If they are only tested every couple of years, they may cause irreparable contamination for the entire time between tests)

• the results of all well integrity testing programs and any remedial actions undertaken be publicly reported. (Comment – in a manner that is easily accessible to the public)

Recommendation 5.4 (p. 61)

That gas companies be required to develop and implement a well integrity management system for each well in compliance with ISO 16530-1:2017. (Comment – which exceeds the ISO)

That each well must have an approved well management plan in place that contains, at a minimum, the following elements:

• consideration of well integrity management across the well lifecycle; (Comment – this can't just be a consideration, it must be a mandated factor)

• a well integrity risk management process that documents how well integrity hazards are identified and risks assessed; (Comment – and includes a response and remediation plan)

• a well barrier plan containing well barrier performance standards, with specific reference to protection measures for beneficial use aquifers; (Comment – for all aquifers, some might become beneficial in the future as aquifers are still poorly understood)

• a process for periodically verifying well barrier integrity through the operational life of the well and immediately prior to abandonment, and for reporting to the regulator the findings from integrity assessments; (Comment – must be for exploration & production wells, and continue after abandonment. Verification must be regularly conducted, not just periodically)

• characterisation data for aquifers, saline water zones, and gas bearing zones in the formations intersected during drilling; and (Comment – this data should be publicly assessible)

• monitoring methods to be used to detect migration of methane along the outside of the casing.
(Comment – outside casing and cement, with any methane migration to be reportable to both the regulator and the public)

Recommendation 5.5 (p. 65)

That the composition (inorganics, organics and NORMs) of flowback fluids, in addition to hydraulic fracturing fluids, be made publicly available. (Comment – and be easily accessible to the public)

[23] https://news.stanford.edu/2017/12/12/small-earthquakes-fracking-sites-may-indicate-bigger-tremors-come/

Recommendation 5.6 (p. 67)

That in consultation with industry and the community, the Government develop a wastewater management framework for any onshore shale gas industry. Consideration must be given to the likely volumes and nature of wastewaters that will be produced by the industry during the exploration and production phases. (Comment – a management plan for the solid contaminants removed from the water also be included)

That the absence of any treatment and disposal facilities in the NT for wastewater and brines produced by the industry be addressed as a matter of priority.

Recommendation 5.7 (p. 69)

That in consultation with industry and the community specific guidance be implemented by the Government, drawing on protocols and procedures developed in other jurisdictions, for the characterisation, segregation, potential reuse and management of solid wastes produced by the shale gas industry. (Comment – the report suggests using waste as road base (p.69), re-used waste must not contain any harmful contaminants, including naturally occurring harmful substances)

Recommendation 5.8 (p. 70)

That to minimise the risk of occurrence of felt seismic events during hydraulic fracturing operations, a traffic light system for measured seismic intensity, similar to that in place in the UK, be implemented. (Comment – new reports just released say small events are precursors to large quakes[24] [25])

Recommendation 7.1 (p. 106)

That before any production licence is granted to extract onshore shale gas, the Water Act be amended to require gas companies to obtain water extraction licences under that Act. That the Government introduce a charge on water in the NT for all onshore shale gas activities.
(Comment – The Act must be amended before exploration or the lifting of the moratorium)

Recommendation 7.2 (p. 106)

That the Government request the Australian Government to amend the EPBC Act to apply the 'water trigger' to all onshore shale gas development. (Comment – as a matter of urgency)

[24] Seismicity During the Initial Stages of the Guy-Greenbrier, Arkansas, Earthquake Sequence http://onlinelibrary.wiley.com/doi/10.1002/2017JB014946/full
[25] http://e360.yale.edu/digest/fracking-linked-to-increase-in-texas-quakes-according-to-new-study

Recommendation 7.3 (p. 119)

That the Government develop specific guidelines for human and environmental risk assessments for all onshore shale gas developments consistent with the National Chemicals Risk Assessment framework, including the national guidance manual for human and environmental risk assessment for chemicals associated with CSG extraction. (Comment – I can't comment on the National Guidance Manual as I haven't read it)

Recommendation 7.4 (p. 120)

That a strategic regional environmental and baseline assessment (SREBA), including a regional groundwater model, be developed and undertaken for any prospective shale gas basin before any production licences are granted for shale gas activities in that basin, commencing with the Beetaloo Sub-basin. (Comment – SREBA must be before exploration)

Recommendation 7.5 (p. 121)

That the use of all surface water resources for all onshore unconventional shale gas hydraulic fracturing in the NT be prohibited.

Recommendation 7.6 (p. 123)

That in relation to the Beetaloo Sub-basin:

- the Daly-Roper WCD be extended south to include all the Beetaloo Sub-basin;
- a separate WAP be developed for the northern and southern regions of the Beetaloo Sub-basin;
- the new northern Basin WAP provide for a water allocation rule that restricts the consumptive use to less than that which can be sustainably extracted without having adverse impacts on other users and the environment; and
- the southern Basin WAP prohibits water extraction for shale gas production until the nature and extent of the groundwater resource and recharge rates in that area is quantified.

That in relation to other shale gas basins with similar or greater rainfall than the Beetaloo Sub-basin, WCDs be declared and WAPs be developed to specify sustainable groundwater extraction rates for shale gas production that will not have adverse impacts on existing users and the environment.

That in relation to other potential shale gas basins in semi-arid and arid regions, all groundwater extraction for any shale gas production be prohibited until there is sufficient information to demonstrate that it will have no adverse impacts on existing users and the environment.

Recommendation 7.7 (p. 125)

That the following measures be mandated to ensure that any onshore shale gas development does not cause unacceptable local drawdown of aquifers:

- the drilling of onshore shale gas petroleum wells within 1 km of existing or proposed groundwater bores be prohibited unless hydrogeological investigations and groundwater modelling indicate that a different distance is appropriate, or if the landholder is in agreement with a closer distance;
(Comment – 1km is still to close, should be 2km. Minimum distance must be mandated as an absolute minimum distance and not open to negotiation)

- additional information on the aquifer characteristics is obtained as a result of the strategic regional environmental and baseline assessment recommended in Section 7.4.3;
(Comment – SREBA must be completed before exploration recommences)

- relevant WAPs include provisions that adequately control both the rate and volume of water extraction by the gas companies;

- gas companies be required, at their expense, to monitor drawdown in local water supply bores; and

- companies be required to 'make good' any problems if this drawdown is found to be excessive (that is greater than 1 m). (Comment – due to the impacts of drawdown, this must be reported to the regulator and water extraction must immediately cease and water licences be suspended if this occurs)

Recommendation 7.8 (p. 127)

That reinjection of wastewater into deep aquifers and conventional reservoirs should be prohibited until comprehensive geotechnical investigations are undertaken to show that no seismic activity will occur. (Comment – Reinjection must be permanently be prohibited due to evidence of induced seismic activity elsewhere)

Recommendation 7.9 (p. 130)

That the following information about hydraulic fracturing fluids must be reported and publicly disclosed about hydraulic fracturing fluids prior to any hydraulic fracturing for onshore shale gas:

- the chemicals to be used;

- the purpose of the chemicals;

- how the chemicals will be managed on-site, including how spills will be prevented and if spills do occur how they will be remediated and managed; and

- the laws that apply to the management of the chemicals and how they are enforced.

That the following information about flowback and produced water be reported and publicly disclosed:

- the chemicals and NORMs found;

• how and where the chemicals and NORMs will be managed, transported and treated, including how spills will be prevented and if spills occur, how they will be remediated and managed; and

• the laws that apply to the management of the chemicals and NORMs and their enforcement.
(Comment – must be easily accessible to public, must include official MSDS for the individual chemical ingredients as well as MSDS's for the products used)

Recommendation 7.10 (p. 138)

That in order to minimise the risk of groundwater contamination from leaky gas wells:

• all wells to be hydraulically fractured must be constructed to at least Category 9 or equivalent and tested to ensure well integrity before and after hydraulic fracturing, with the results certified by the regulator (see also Recommendations 5.3 and 5.4);
(Comment – Cat 9 wells can still deform or leak. Test before and after each frac stage as well as ongoing monitoring)

• a minimum offset distance of at least 1 km between water supply bores and well pads must be adopted unless specific site-specific information is available to the contrary (see also Recommendation 7.7); (Comment – 1km is still to close, should be 2km. Minimum distance must be mandated as an absolute distance, not open to negotiation)

• a robust and rapid wastewater spill clean up management plan must be prepared for each well pad to ensure immediate remediation in the event of a spill: and (Comment – plan must include a training requirement, inductions and regular response practice)

• real-time publicly available groundwater quality monitoring must be implemented around each well pad to detect any groundwater contamination. Multilevel observation bores must be used to ensure full coverage of the aquifer horizon, with a level of vertical resolution sufficient to be able to identify the location of any leak. (Comment – Monitoring results be publicly available eg. livestreamed)

Recommendation 7.11 (p. 142)

That to reduce the risk of contamination of surface aquifers from on-site spills of wastewater:

• the EMP for each well pad must include an enforceable wastewater management plan and spill management plan, which must be approved prior to the commencement of hydraulic fracturing;
(Comment – must be for exploration as well as production wells)

• enclosed tanks must be used to hold all wastewater; (Comment – must also be for exploration wells)

• the well pad site must be treated (for example, with a geomembrane) to prevent the infiltration of wastewater spills into underlying soil and thence into to an aquifer; and (Comment – exploration wells too)

• a real-time publicly accessible monitoring program for each well pad must be established.
(Comment – must include exploration wells too)

Recommendation 7.12 (p. 143)

That the Government undertake a review to determine:

- whether restrictions need to be placed on the transport of hydraulic fracturing chemicals and wastewater during the wet season, particularly on unsealed roads; and
- whether rail transport of some or all of the hydraulic fracturing chemicals and other consumables required should be used.

Recommendation 7.13

That the reinjection of treated or untreated wastewaters (including brines) into aquifers not be permitted until detailed investigations are undertaken to determine whether or not the risks associated with this practice can be managed to acceptable levels.
(Comment – reinjection into aquifer risks will never be acceptable, practice must be permanently banned to protect aquifers)

Recommendation 7.14 (p. 146)

That gas companies must submit details of all known fault locations and geomechanical planning to the regulator. (Comment – should also be publicly released. Problem – many micro-faults and fissures are not detectable with current technology yet can still act as migration pathways for contaminants such as gases released by fracking)

Recommendation 7.15 (p. 146)

That appropriate site-specific modelling of the local groundwater system must be undertaken before any water is extracted for the purposes of onshore hydraulic fracturing for shale gas in order to ensure that there are no unacceptable impacts on groundwater quality and quantity.
(Comment – for exploration and production. Should be as part of Water Act requirements for fracking. See Recommendation 7.1)

Recommendation 7.16 (p. 147)

That the discharge of shale gas hydraulic fracturing wastewater (treated or untreated) to either drainage lines, waterways, temporary stream systems or waterholes not be permitted.

Recommendation 7.17 (p. 149)

That to minimise the adverse impacts of onshore shale gas infrastructure (roads and pipelines) on the flow and quality of surface waters, the Government must ensure that:

- landscape or regional impacts are considered in the design and planning phase of development to avoid unforeseen consequences arising from the incremental (piecemeal) rollout of linear infrastructure ; and

- roads and pipeline corridors must be constructed to:
    - minimise the interference with wet season surface water flow paths;
    - minimise erosion of exposed (road) surfaces and drains; (Comment – minimise all erosion)
    - ensure fauna passage at all stream crossings; and
    - comply with relevant guidelines such as the International Erosion Control Association Best Practice for Erosion and Sediment Control and the Australian Pipeline Industry Association Code of Environmental Practice 2009.

    (Comment – pipelines and roads must be monitored to ensure compliance over time)

Recommendation 7.18 (p. 150)

That the Beetaloo Sub-basin SREBA should take into account all groundwater dependent ecosystems in the Roper River region. (Comment – and Mataranka, Katherine and Daly regions, as the groundwater flows north and discharges into rivers, springs... See map on p. 99 of draft Final Report)

Recommendation 7.19 (p. 151)

That the Beetaloo Sub-basin SREBA should take into account all subterranean aquatic ecosystems in the Roper River region. (Comment – and any other interlinked or connected regions)

Recommendation 8.1 (p. 172)

That strategic regional terrestrial biodiversity assessments are conducted as part of a SREBA for all bioregions prior to any onshore shale gas production, with all onshore shale gas development excluded from areas considered to be of high conservation value. The results of the SREBA must inform any decision to release land for exploration as specified in Recommendation 14.2 and be considered by the decision-maker in respect of any activity-based EMP. (Comment – must be prior to exploration and must be conducted by an independent organisation/body. Perhaps a fund paid by gas companies can be set up and this money used to pay a branch of NT Parks and Wildlife department, or a pool of independent surveyors can randomly be assigned to conduct SREBAs)

Recommendation 8.2 (p. 176)

That a baseline assessment of all weeds within a permit area be conducted prior to any onshore shale gas exploration or development and that ongoing weed monitoring be undertaken to inform any weed management measures necessary to ensure no incursions or spread of weeds. Gas companies must have a dedicated weeds officer whose role is to monitor well pads, roads and pipeline corridors for weeds. (Comment – weed manager must also remove weeds, not just monitor)

Recommendation 8.3 (p.176)

That gas companies be required to have a weed management plan in place prior to entering onto a petroleum permit. The plan must be consistent with all relevant statutory weed management plans and relevant threat abatement plans established under the EPBC Act. (Comment – vehicles, equipment and personnel must be inspected and declared weed free before entering properties)

Recommendation 8.4 (p. 181)

That gas companies be required to comply with any statutory regional fire management plan. The fire management plan should:

• address the impact that any onshore shale gas industry will have on fire regimes in the NT, and how those impacts should be managed;

• establish robust monitoring programs for assessing seasonal conditions and fuel loads;

• require that annual fire mapping be undertaken to monitor any increase in fire frequency due to any onshore shale gas development;

• require baseline data to be established for at least the decade prior to commencement of any onshore shale gas development; and

• require the implementation of management actions, such as prescribed fuel reduction burns at strategic locations, to reduce fuel loads and protect key values and assets if required on the basis of the annual fuel monitoring data. (Comment – scorched earth policy not acceptable as it increases footprint & annual burns are bad for the environment. The Ranger mine burnt fragile areas in Kakadu with an out of control 'strategic burn')

(Comment – the burden of extinguishing fires caused by gas activities or employees should not fall to landholders. Landholders should be compensated for loss of crops or pasture due to fires)

Recommendation 8.5 (p. 184)

That as part of a SREBA, a study be undertaken to determine if any threatened species are likely to be affected by the cumulative effects of vegetation and habitat loss, and if so, that there be ongoing monitoring of the populations of any such species. If monitoring reveals a decline in populations (compared with pre-development baselines), management plans aimed at mitigating these declines must be developed and implemented.

(Comment – management plans to mitigate declines should be implemented prior to starting any exploratory or production activities)

Recommendation 8.6 (p. 184)

That the area of vegetation cleared for infrastructure development (well pads, roads and pipeline corridors) be minimised through the efficient design of flowlines and access roads, and where possible, the co-location of shared infrastructure by gas companies.

Recommendation 8.7 (p. 184)

That well pads and pipeline corridors be progressively rehabilitated, with native vegetation re-established such that the corridors become ecologically integrated into the surrounding landscape.

Recommendation 8.8 (p. 184)

That to compensate for any local vegetation, habitat and biodiversity loss, the Government develop and implement an environmental offset policy to ensure that, where environmental impacts and risks are unable to be avoided or adequately mitigated, they are offset.
(Comment – if risks and impacts can't be avoided in an area, fracking should not occur there. This could impact migratory species or isolate populations)

Recommendation 8.9 (p. 184)

That the Government consider the establishment and operation of local Aboriginal land ranger programs to undertake land conservation activities.
(Comment – set up by Government, funded by gas companies. They could also participate in SREBAs under supervision of an experienced biologist)

For Recommendations 8.10 – 8.14, the Panel says "With these mitigation measures in place, the Panel's assessment is that the likelihood of corridor impacts would remain, but that the consequence would be minor to moderate with an overall risk of 'low' and acceptable" (p. 185)

Recommendation 8.10 (p. 185)

That environmental legislation include a requirement for gas companies to identify critical habitats during corridor construction and select an appropriate mechanism to avoid detrimental impact on them. (Comment – this could include building wildlife tunnels or bridges)

Recommendation 8.11 (p. 185)

That corridor widths be kept to a minimum, with pipelines and other linear infrastructure buried, except for necessary inspection points, and the disturbed ground revegetated.

Recommendation 8.12 (p. 185)

That directional drilling under stream crossings be used in preference to trenching unless geomorphic and hydrological investigations confirm that trenching will have no detrimental impact on water flow patterns and waterhole water retention timing. (Comment – streams and waterways and water bodies should be avoided)

Recommendation 8.13 (p. 185)

That roads and pipeline surface water flow paths minimise erosion of all exposed surfaces and drains, and comply with design for fauna passage.

Recommendation 8.14 (p. 185)

That all corridors be constructed to minimise the interference with wet season stream crossings and comply with relevant guidelines, such as the International Erosion Control Association Best Practice for Erosion and Sediment Control and the Australian Pipeline Industry Association Code of Environmental Practice 2009.

Recommendation 8.15 (p. 189)

That to minimise the impact of any onshore shale gas industry on landscape amenity, gas companies must demonstrate that they have minimised the surface footprint of development to ALARP, including that:

• well pads are spaced a minimum of 2 km apart; and

• the infrastructure within any development areas is not visible from major public roads. (Comment – or visible from any existing home, dwelling, other accommodation or place people regularly visit)

Recommendation 8.16 (p. 190)

That the Government assess the impact that all heavy-vehicle traffic associated with any onshore shale gas industry will have on the NT's transport system and develops a management plan to mitigate such impacts. Consideration must be given to:

• forecast traffic volume and roads used;

• the feasibility of using the existing Adelaide - Darwin railway line to reduce heavy-vehicle road use; and

• road upgrades.

New / Suggested Recommendation – 8.17

That gas industries contribute to a fund to assist Wildcare rescue, raise, rehabilitate and release injured or orphaned wildlife who need care due to gas activities.

Recommendation 9.1 (p. 202)

That to reduce the risk of upstream methane emissions from onshore shale gas wells in the NT the Government implement the US EPA New Source Performance Standards of 2012 and 2016. (Comment – I haven't read the US EPA Standards, so can't assess)

Recommendation 9.2 (p. 208)

That a code of practice be developed and implemented for the ongoing monitoring, detection and reporting of methane emissions from onshore shale gas fields and wells once production of any onshore shale gas commences. (Comment – the Code must be developed and implemented before exploration fracking resumes, and monitor exploration, production and after abandonment)

Recommendation 9.3 (p. 208)

That baseline monitoring of methane concentrations be undertaken for at least one year prior to the commencement of shale gas production on a production licence. (Comment – baseline monitoring must occur prior to exploration, as exploratory wells also release methane and can alter baseline results)

Recommendation 9.4 (p. 208)

That baseline and ongoing monitoring be the responsibility of the regulator, undertaken by an independent third party, and funded by industry.

Recommendation 9.5 (p. 208)

That all monitoring results should be published online on a continuous basis in real time. (Comment – and be easily accessible to the public)

Recommendation 9.6 (p. 208)

That once emission concentration limits are exceeded, the regulator must be notified, investigations must be undertaken to identify the source(s) of the excess levels, and makegood provisions be undertaken by industry where necessary. These measures are to be the responsibility of industry. (Comment – must have time constraints added eg immediate emission suppression, immediate regulator notification)

Recommendation 9.7 (p. 219)

That the action framework outlined in Table 9.10 be implemented to mitigate any supplementary risks that may prevent the achievement of lower levels of fugitive methane emissions.
(Comment – needs to say who will implement, monitor, resource, and enforce regulations)

Recommendation 10.1 (p. 230)

That formal site or regional-specific HHRA reports be prepared and approved prior to the grant of any production licence for the purpose of any shale gas development. Such HHRA reports to address the potential human exposures and health risks associated with the exploration for, and the production of, any shale gas development, off-site transport, and the decommissioning of wells, as recommended in NCRA guidance. The HHRA reports must include risk estimates assessments of exposure pathways that are deemed to be incomplete. (Comment - HHRA (Human Health Risk Assessment) reports must be for individual sites (p. 229) as well as regional. Must be prior to exploration well approvals)

Recommendation 10.2 (p. 230)

That to better inform the human health risk assessments, the following knowledge gaps must be addressed and published:

• contemporary knowledge of the chemicals proposed to be used in hydraulic fracturing fluids for onshore shale gas extraction in the NT;

• details of the chemical composition of flowback and produced water in the NT; and

• the proposed methods of treatment and/or disposal of flowback and produced water.
(Comment – must also include reactions that chemical combinations produce, management of solid wastes, and possible air borne contaminants)

Recommendation 10.3 (p. 238)

That in consultation with industry, landowners and local communities, the regulator set appropriate setback distances to minimise risks identified in HHRA reports, including potential pathways for waterborne and airborne contaminants, for all shale gas development (exploration and production). Such setback distances to be not less than 1,600 m.
(Comment – 1,600m is absolute minimum. 2,000m preferred using the precautionary principle. Consultation should be between the regulator, health experts and local communities, as industry has a conflict of interest. Consider historical health examples of conflict of interest such as asbestos, tobacco and PFAS)

Chapter 11. Aboriginal People and Their Culture

Recommendation 11.1 (p. 256)

That gas companies be required to obtain an Authority Certificate prior to undertaking any onshore shale gas activity. (Comment – this is to be signed by the Traditional Owners, with the TOs also being given a signed copy[26])

Recommendation 11.2 (p. 258)

That AAPA:

• be provided with a copy of any application to conduct hydraulic fracturing for onshore shale gas under petroleum environment legislation at an early stage of the assessment and approval process;

• be given an adequate opportunity to explain the application to custodians; and

• be given an adequate opportunity to comment on the application and have those comments considered by the decision-maker. (Comment – the decision maker must abide by these comments, not just consider them)

[26] http://www.energynewsbulletin.net/exploration/news/1100768/hancock-hits-back-at-shale-challengers

Recommendation 11.3 (p. 260)

That legislation for the protection of sacred sites be amended so that sub-surface formations can be included as a sacred site or a feature of a sacred site.

Recommendation 11.4 (p. 263)

That gas companies be required to provide a statement to native title holders with information of the kind required under s 41(6) of the Land Rights Act for the purposes of negotiating a petroleum exploration agreement under the future act provisions of the Native Title Act.
(Correction - under s46 of the Land Rights Act[27])

Recommendation 11.5 (p. 263)

That interpreters be used at all consultations with Aboriginal people for whom English is a second language. Interpreters must be appropriately supported to ensure that they understand the subject matter of the consultation.
(Comment – The Coffey consultations did not do this[28])

Recommendation 11.6 (p. 266)

That Land Councils, AAPA, and the Government cooperate to ensure that reliable, accessible (including with the use of interpreters), trusted, and accurate information about any onshore shale gas industry is effectively communicated to all Aboriginal people that will be affected by any onshore shale gas industry. (Comment – the information must be unbiased and also discuss risks and negative consequences[29]. The land councils have a deplorable track record of truly representing Indigenous people[30])

Recommendation 11.7 (p. 266)

That Land Councils, traditional Aboriginal owners and gas companies consider making all, or if this is not appropriate, part, of negotiated petroleum exploration agreements publicly available. (Comment – must be all agreements. This will prevent the wrong or inappropriate people from signing the documents, as happened with the Muckaty nuclear waste dump agreement[31])

[27] https://www.legislation.gov.au/Details/C2013C00556
[28] http://caama.com.au/news/2017/the-latest-caamas-update-from-the-current-community-consultation-meetings-about-fracking
[29] http://www.energynewsbulletin.net/exploration/news/1100768/hancock-hits-back-at-shale-challengers
[30] https://www.welcometocountry.org/land-council-locks-elders-out-meetings/
[31] http://www.abc.net.au/news/2014-06-19/northern-land-council-withdraws-muckaty-creek-nomination/5535318

Recommendation 11.8 (p. 267)

That a comprehensive assessment of the cultural impacts of any onshore shale gas development be completed prior to the grant of any production licence. The cultural assessment must:

• be designed in consultation with Land Councils and AAPA;

• engage traditional Aboriginal owners, native title holders and the affected Aboriginal communities, and be conducted in accordance with world leading practice; and

• be resourced by the gas industry. (Comment – before any exploration licence)

Chapter 12 Social impacts

Recommendation 12.1 (p. 274)

That as part of any strategic SIA, early and adequate consultation be undertaken on road use and related infrastructure requirements that result in realistic road upgrade and work schedules to support the required transport infrastructure for any unconventional shale gas industry and other users.

Recommendation 12.2 (p. 274)

That gas companies ensure the provision of adequate and sustainable funding to ensure the identified infrastructure requirements are met and maintained appropriately.

Recommendation 12.3 (p. 274)

That consideration be given to the development of road use agreements between gas companies and local councils that include safety considerations and ensure monitoring for compliance, including reporting requirements.
(Comment - Not all areas have a local council, some have progress associations, others have nothing, some roads are private roads maintained by landholders, and some roads are maintained by the Federal Government)

Recommendation 12.4 (p. 275)

That gas companies be required to work closely with the Government and local communities early in any onshore shale gas development projects to ensure that any potential impacts on services are mitigated.

Recommendation 12.5 (p. 275)

That any strategic social impact assessment anticipate the long-term impacts and requirements for housing (not just through construction phase) to adequately mitigate the risk of inflated real estate prices and shortages within a community. (Questions – What about the bust after the boom, when real estate values crash? What about decreased values due to proximity to gas infrastructure?)

Recommendation 12.6 (p. 275)

That in consultation with local communities, Aboriginal Land Councils, local government, and the Government, gas companies be required to provide accommodation, whether temporary or permanent, which must be completed prior to the construction/development phase.

Recommendation 12.7 (p. 279)

That there be a minimum standard set for gas companies to source goods, services and workers from local communities. This should include ensuring training programs are developed for Aboriginal and other local workers to develop the necessary skill sets and to improve their opportunities for local employment in any onshore shale gas industry. (Comment – this was done prior to Inpex starting and they still employed FIFOs and relocated interstate workers to live in the Howard Springs camp and Darwin motels)

Recommendation 12.8 (p. 279)

That gas companies use a range of mediums to proactively work with local businesses to ensure they are able and adequately skilled to compete for contracts. They should follow the steps outlined above by the Queensland Gasfields Commission to assist them to be ready to participate in any economic opportunities that may emerge. (Comment – many interstate businesses moved here recently & now call themselves 'local'. They are able to out-compete our smaller, truly local businesses. I haven't read the Queensland Gasfields Commission document so can't comment on it)

Recommendation 12.9 (p. 279)

That the Government regulate to ensure that existing and future users of land can continue to enjoy their rights and interests in the land, including a mechanism to compensate for, among other things:

• loss of use of surface area where infrastructure is installed;

• 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 areas of the landholder's property; and

• any cost, damage or loss arising from the carrying out of activities on the land. (Comment – must include both land directly used by industry, and surrounding areas which may be affected. Compensation must be large to encourage full mitigation of risks)

Recommendation 12.10 (p. 281)

That gas companies be required to establish a relationship with communities to determine how to best facilitate community cohesion on an individual and collective level. This should be done in consultation with Aboriginal land councils and local councils, to ensure that the needs of all parties are accommodated.
(Comment – what if cohesion can not be facilitated between the gas industry and communities? Also, not all areas have local council)

Recommendation 12.11 (p. 281)

That gas companies must develop and implement a social impact management plan to communities, which details how they will optimise the relationship with the community prior to any onshore shale gas development. This plan must be developed in consultation with Aboriginal land councils and local councils to ensure that it meets community needs and be presented to the regulator for approval prior to any production approval being granted.
(Comment – what if the relationship can't be 'optimised' due to continuing opposition?)

Recommendation 12.12 (p. 283)

That gas companies be required to develop a social impact management plan that outlines how they intend to develop and continue their SLO within each of the communities they will operate in. This should be developed in conjunction with any SIA, and introduced as early as possible, preferably in the exploration phase, to ensure that any potential changes can be flagged in advance to allow communities time to adapt and prepare for the changes.
(Comment – It is likely communities will continue to refuse a social licence to operate – what then?)

Recommendation 12.13 (p. 294)

That a strategic SIA, separate from an Environmental Impact Statement (EIS), be conducted in advance of any onshore shale gas development, during the exploration phase. Such SIAs must be conducted holistically to anticipate any expected impacts on infrastructure and services, and to mitigate potential negative impacts, and be funded by industry.
(Comment – What if the SIA finds no SLO exists? What if impacts can't be mitigated to a level acceptable to community?)

Recommendation 12.14 (p. 294)

That early engagement and communication of the findings of the strategic SIA be systematically undertaken with all potentially affected communities and with all levels of government to ensure that unintended consequences are limited and shared understanding of roles and responsibilities, including financial responsibilities, can be developed.

Recommendation 12.15 (p. 294)

That ongoing monitoring and measurement of social and cumulative impacts be undertaken with the results publicly available. (Comment – What if impacts are found to be unacceptable?)

Recommendation 12.16 (p. 298)

That in order to operationalise an SIA framework in the NT the Government should make the following structural reforms:

- introduce mechanisms for strategic assessment, either through a Strategic Assessment Agreement under the EBPC Act, or through reforms proposed in the 2015 Hawke Report. A strategic SIA is

needed to decide if any onshore shale gas industry should go ahead, and if so, under what conditions; (Comment – as community opposition will continue, this lack of SLO should result in fracking being banned throughout the NT)

- establish or enhance an independent authoritative body, such as the EPA or a newly established independent regulator (see Chapter 14), with powers to request information from, and to facilitate the collaboration between individual gas companies, and between gas companies, government agencies (including local government), communities and landholders; (Comment – the EPA has repeatedly shown it would be unable to perform such a task, a new independent body should be formed to manage this)

- establish a long-term participatory regional monitoring framework, overseen by the EPA or the independent regulator, with secure funding (raised from industry levies) and able to endure multiple election cycles; and

- establish periodic and standardised reporting to communities on the social, economic and environmental performance of the industry through either the independent regulator or a specialised research institution. This includes information from the monitoring of key indicators, and an industry-wide complaints and escalation process. (Comment – there must be a facility for anonymous complaints, reports should be publicly available and easily accessible)

Chapter 13 Economic impacts

Recommendation 13.1 (p. 323)

That in developing its budget the Government consider the source of royalty revenue to ensure that regions that are the source of taxation revenue benefit from any onshore shale gas extraction activity that has occurred in that region.
(Comment – this assumes there will be significant royalty revenue, which is not likely to be the case (IEEFA, TAI, ACIL Allen report))

Recommendation 13.2 (p. 324)

That the Government work with stakeholders and gas companies to ensure that there is early knowledge of the labour and skills required for all phases of any onshore shale gas development to maximise local employment.

Recommendation 13.3 (p. 324)

That the Government work with gas companies, training providers, local workers, job seekers, Land Councils and local Aboriginal corporations and communities to maximise opportunities for local people to obtain employment during all phases of any onshore shale gas development.
(Comment – this was a condition for Inpex & they still preferred interstate workers)

Recommendation 13.4 (p. 324)

That the Government ensure that training providers and gas companies collaborate so that skill requirements are clearly understood by training providers, and that trainees acquire appropriate skills.

Recommendation 13.5 (p. 325)

That the Government work with gas companies and local suppliers to ensure there is early knowledge of local supply and service opportunities for all phases of any onshore shale gas development.

Recommendation 13.6 (p. 325)

That the Government work with gas companies and local suppliers (regional and Territory wide) to identify immediate supply opportunities and to map future potential supply opportunities. This should be done in consultation with the ICN-NT and the Chamber of Commerce.

Recommendation 13.7 (p. 325)

That the Government work with gas companies, Land Councils, local Aboriginal corporations, Aboriginal communities, and businesses to identify local supply and service opportunities to keep sustainable economic benefits on country.

Recommendation 13.8 (p. 325)

That the Government assist regional businesses to obtain quality assurance certification and to partner with larger suppliers to encourage greater local supply, employment and knowledge transfer. (Comment – will partnering take money out of the NT?)

Recommendation 13.9 (p. 326)

That the Government work with gas companies, peak bodies of affected industries, and affected stakeholders to identify and resolve potentially negative economic impacts of any onshore shale gas development on other industries.
(Comment – Doubt it is possible to resolve negative impacts and continue industry eg primary production)

Recommendation 13.10 (p. 327)

That the Government work with all levels of government, peak organisations, communities and gas companies to identify and manage infrastructure risks, including identifying options to fund any new infrastructure or upgrade existing infrastructure.

Chapter 14 Regulatory reform

Recommendation 14.1 (p. 339)

That the Government design and implement a full cost recovery system for the regulation of any onshore shale gas industry.

Recommendation 14.2 (p. 341)

That the Minister publish any proposed land release for any onshore shale gas exploration.

That the Minister must consult with the community and stakeholders and consider any comments received in relation to any proposed land release.

That the Minister be required to take into account the following matters when deciding whether or not to release land for exploration:

- the prospectivity of the land for petroleum;
- the possibility of coexistence between the onshore gas industry and any existing or future industries in the area; and
- whether the land is an area of intensive agriculture, high ecological value, high scenic value, culturally significant or strategic significance. (Comment – fracking must be banned in these areas)

That the Minister publish a statement of reasons why the land has been released and why coexistence is deemed to be possible.
(Comment – The public must be able to respond to statements)

Recommendation 14.3 (p. 341)

That Government consider mechanisms, including an amendment to the Petroleum Act, to ensure that applications that are currently extant are not granted in relation to areas that are not prospective for onshore shale gas or where coexistence is not possible. Consideration must be given to areas of intensive agriculture, high ecological value, high scenic value, cultural significance and strategic significance. (Comment – also recreational and historical value)

Recommendation 14.4 (p. 344)

That the following areas must be declared reserved blocks under s 9 of the Petroleum Act, each with an appropriate buffer zone:

- areas of high tourism value;
- towns and residential areas (including areas that have assets of strategic importance to nearby residential areas);
- national parks;
- conservation reserves;
- areas of high ecological value; and
- areas of cultural significance.

(Comment – also recreational value & historical value)

Report Quote: "Pastoralists should not have a statutory right of veto" (p. 349) (Comment – landholders must have a right to veto to give them certainty for their business and land use plans)

Recommendation 14.5 (p. 351)

That prior to undertaking any onshore shale gas activity on a Pastoral Lease (including exploration), a land access agreement must be signed by the Pastoral Lessee and the gas company.

That the land access agreement be required by legislation.

That breach of the land access agreement will be a breach of the relevant approval giving rise to the petroleum activity being carried out on the land.
(Comment – That an agreement is required by the gas company prior to exploration, but is NOT a mandatory agreement for the landholder)

Recommendation 14.6 (p. 353)

That in addition to any terms negotiated between the pastoralist and the gas company, the statutory land access agreement must contain standard minimum protections for pastoralists.

Recommendation 14.7 (p. 354)

That the Government consider implementing a mandatory minimum compensation scheme payable to Pastoral Lessees for all onshore shale gas production on their Pastoral Lease. Compensation should be by reference to the number of wells drilled on the Pastoral Lease and the area of land cleared and rendered unavailable to the Pastoral Lessee. (Comment – the mandatory minimum should be able to be exceeded)

Recommendation 14.8 (p. 354)

That the Government consider whether a royalty payment scheme should be implemented to compensate Pastoral Lessees for all new petroleum fields brought into production. (Comment – unsure, I can see both negatives and positives for this)

Recommendation 14.9 (p. 357)

That any person may lodge an objection to the proposed grant of an exploration permit.

That the Minister must, in determining whether to grant or refuse the application, take into account the objections received, and that all objections received by the Minister be published. (Comment – the Minister must act on the objections received, not just acknowledge them)

Recommendation 14.10 (p. 359)

That the Petroleum Act be amended to require the Minister to take into account and apply the principles of ESD. (Comment – the principles of ESD must always be implemented)

Recommendation 14.11 (p. 360)

That the Minister must not grant an exploration permit unless satisfied that the gas company is a fit and proper person, taking into account, among other things, the company's environmental history and history of compliance with the Petroleum Act and any other relevant petroleum legislation.

That the Minister's reasons for determining whether or not the gas company is a fit and proper person be published. (Comment – the companies' full history both in Australia and overseas must be investigated, also the company directors and CEOs)

Recommendation 14.12 (p. 361)

That Government develop a financial assurance framework for the onshore shale gas industry. The framework must:

- be transparent and developed in consultation with the community and key stakeholders;
- clarify the activities that require a bond or security to be in place and describe how the amount of the bond or security is calculated; and
- require the public disclosure of all financial assurances and the calculation methodology.

(Comment – must cover exploration activities such as seismic lines as well as production)

Recommendation 14.13 (p. 362)

That the government impose a non-refundable levy for the long-term monitoring, management and remediation of abandoned onshore shale gas wells in the NT. (Comment – this levy must be based on realistic costs of infinite monitoring and remediation)

Recommendation 14.14 (p. 366)

That all draft EMPs for hydraulic fracturing must be published and available for public comment prior to Ministerial approval.

That all comments made on draft EMPs be published.

That the Minister must take into account comments received during the public consultation period when assessing a draft EMP. (Comment – the Minister must include all practical suggestions made)

Recommendation 14.15 (p. 367)

That all notices and reports of environmental incidents, including reports about reportable incidents under the Petroleum Environment Regulations, must be published.
(Comment – must be easily accessible to the public and include all incidents, not just 'reportable' ones)

Recommendation 14.16 (p. 368)

That the Schedule be repealed and replaced with legislation to regulate seismic surveys, drilling, hydraulic fracturing, and well abandonment prior to the grant of any production licence for the purpose of any onshore shale gas development. (Comment – This must be done prior to any further exploration)

Recommendation 14.17 (p. 370)

That the Government develop and implement enforceable codes of practice with minimum, prescriptive, standards and requirements to give clarity to the regulatory framework.

Recommendation 14.18 (p. 372)

That the Minister must be satisfied that a gas company is a fit and proper person to hold a production licence prior to the licence being granted. (Comment – also for exploration licences and for transferring of licences)

Recommendation 14.19 (p. 375)

That, as part of the environmental assessment and approval process, the Minister be required to consider the cumulative impacts of any proposed onshore shale gas activity.
(Comment – cumulative over time and spatial scales)

Recommendation 14.20 (p. 375)

That the Government consider developing and implementing a regional or area-based assessment in the regulation of any onshore shale gas industry in the NT.
(Comment – Regional Planning is important, but must not replace site specific plans, both are needed)

Recommendation 14.21 (p. 376)

That the Petroleum Act and Petroleum Environment Regulations be amended to allow open standing to challenge administrative decisions made under these enactments. (Comment – this must be enacted to encourage sound decisions)

Recommendation 14.22 (p. 377)

That merits review be available in relation to decisions under the Petroleum Act and Petroleum Environment Regulations including, but not limited to, decisions in relation to the granting of exploration permits and approval of EMPs.

That the following third parties, at a minimum, have standing to seek merits review:

• proponents (that is, gas companies) who are seeking a permit, approval, application, licence or permission to engage in onshore shale gas activity;

• persons who are directly or indirectly affected by the decision;

• members of an organised environmental, community or industry group;

• Aboriginal Land Councils;

• local government bodies; and

• persons who have made a genuine and valid objection during any assessment or approval process.

That an independent body, such as NTCAT, be given jurisdiction to hear merits review proceedings in relation to any onshore shale gas industry. (Comment – this must be enacted in full to ensure proper decisions and accountability)

Recommendation 14.23 (p. 378)

Where litigation is brought genuinely in the public interest, that costs rules be amended to allow NT courts to not make an order for the payment of costs against an unsuccessful public interest litigant.

Recommendation 14.24 (p. 380)

That the Government develop and implement a robust and transparent compliance monitoring strategy, having regard to the principles set out in the ANAO Administering Regulation: Achieving the right balance guide, and the policy in SA. (Comment – Compliance monitoring is absolutely essential. I haven't fully read these documents so can't assess)

Recommendation 14.25 (p. 380)

That the Government enact whistleblower protections.

That a hotline be established to make anonymous reports about any onshore shale gas industry non-compliance and that such reports be investigated. (Comment – this must be implemented)

Recommendation 14.26 (p. 381)

That the Government consider developing and implementing a tiered regulatory model such as the one in SA, whereby gas companies with a demonstrated record of good governance and compliance require a lower level of monitoring, with a corresponding reduction in regulatory fees. (Comment – NO, this allows a company to become lax if monitoring is reduced, though a reduction in regulatory fees is acceptable)

Recommendation 14.27 (p. 382)

That the Government enact a broader range of powers to sanction, including but not limited to:

- remediation orders;
- enforceable undertakings;
- injunctions; and
- civil penalties.

Recommendation 14.28 (p. 382)

That the Government allow civil enforcement proceedings to be instituted to enforce potential or actual non-compliance with the legislation governing any onshore shale gas industry.
(Comment – this must be clarified to ensure it is not used against people protecting their land by denying access to gas companies)

Recommendation 14.29 (p. 383)

That the Government consider enacting provisions that reverse the onus of proof or create rebuttable presumptions for pollution and environmental harm offences for all regulated onshore shale gas activities. (Comment – this must be implemented)

Recommendation 14.30 (p. 384)

That penalties for environmental harm under the Petroleum Act and Petroleum Environment Regulations be reviewed and increased in line with leading practice. (Comment – penalties must be extreme to ensure compliance, otherwise they may be factored in to the cost of doing business)

Recommendation 14.31 (p. 385)

That in order to ensure independence and accountability, there must be a clear separation between the agency with responsibility for regulating any onshore shale gas industry and the agency responsible for promoting that industry. (Comment – the government should be prohibited from promoting this industry, they have APPEA to do that)

Recommendation 14.32 (p. 392)

That the Government develop and implement the reforms described in Option 1 and/or Option 2 above prior to any production licences being issued for any onshore shale gas activities in the NT.
(Comment – prior to exploration, as our current system is lacking. I prefer we go straight to implementing Option 2)

Recommendation 15.1 (p. 395)

That a strategic regional environmental and baseline assessment (SREBA) be undertaken prior to the grant of any production licence for onshore shale gas. (Comment – prior to exploration commencing)

New Suggested Recommendation

That a specially dedicated, one stop shop type of fracking website be created where the public can easily access all the data and information from monitoring, see proposed applications open for comment, see agreements and reports of accidents and spills, follow induced seismic activity and emission rates, etc.