



Lock the Gate – Hearing Transcript

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Speaker: Naomi Hogan

Naomi Hogan: My name is Naomi Hogan and I'm appearing on behalf of the Lock the Gate Alliance Australia.

Hon. Justice
Rachel Pepper: Thank you very much Mrs. Hogan. Please.

Naomi Hogan: I'd like to begin by acknowledging and paying respects to the Larrakia people and whose land we meet and also acknowledge any other aboriginal or Torres Strait Islander people here this morning.

To begin I'd like to explain who the Lock the Gate Alliance are and how we came to be. About five six years ago in Queensland a number of farmers had signed access agreements with Coulson Gas Companies, and a number of others their neighbours had. There was a high level of concern from people that had signed those initial agreements. That they weren't aware of what the production phase was going to be on their land.

They became very concerned about impacts of 24 seven impacts on their property from workers, weed infestations, problems with their water bores, and also that they were told that they didn't have a right to say no to the agreement. That it would be happening, and that they were to sign these agreements that then would become confidential, and not able to be shared. From that many farmers started to get together and talk amongst themselves about what was going on and they proposed that those who hadn't signed yet, propose that they would lock their gate to these gas companies coming on to their land.

From there the movement has grown right across Australia because people have been concerned about the impacts of the industry and that's what I'll speak to today. From that we've now formed a positive vision of why we're all working together from those early roots, which I've explained on this slide.

A vision is of a healthy empowered communities, which have fed Democratic processes available to them to protect their land and water, and deliver sustainable solutions for food and energy needs.



Today I'd like to raise key points, first of which being the shale gas industry often overlooks or doesn't talk about in their public communications or with their land holders that their negotiating with at the early stages. The full production extent of a gas field and what is required. I'd like to make the point that the risk factors are greater with shale gas and unconventional gas developments due to the thousands of wells that are required. In the case of shale, to be horizontally hydraulic fractured and then the infrastructure and pipelines associated with that.

I'd like to make the point that the high regulatory burden and the cost involved are something that the shale gas companies in the Northern Territory may not want to spend a lot of money on because it is actually in Australia according to industry documents. The most expensive to extract type of gas in Australia the deep shale rock of the Northern Territory. There is recent and overwhelming scientific peer reviewed evidence that shows harm and pollution increasing as the shale gas industry has increased rapidly in recent years.

My first points I'd like to address, the terms of reference and your point one to access the scientific evidence. That nature extent of environmental impacts and risks and cumulative impacts. In the context of the Northern Territory, it is a fact that 85 percent of the Northern Territory is either covered by and exploration licence that has been approved for oil and gas activities or is under application.

Certainly, we have been talking with communities, wanting applications to be taken away so that that number is lower and so the maps don't look as scary. However, the government and the companies have not taken that action. Those exploration licences and applications remain there today.

We've had a massive extent of increased scientific evidence that's come to light in recent years. Specifically, around the shale Gas Industry as it's expanded. As you can see from this table, from 2009 there were very few peer reviewed scientific papers on the matter. This was put out in early 2016 referring to the weight of evidence produced in 2015. That weight of evidence has continued to expand with both the growth of the industry. Particularly in the United States and Canada, and with the interest of the scientific community in terms of what's taking place.

I can say that while it's not every report there is a high level of ... Or the ration is very high, anywhere from 70 to 90 percent showing that there is harm, or pollution, or a link between these shale Gas activities taking place, and risks to the air, the water, and the landscape.

All of the peer reviewed scientific papers are available to the public online through this citation database, which I've just put that picture there. It also sounds like the panel has been doing an exceptional amount of work in reading the literature already to this point, and I thank you for that.



That's just a slide that talks to some of the ... It's an international slide, talking to some of the impacts that people are concerned about when we talk about the shale oil and gas industry. Again mostly from the United States. That's just a diagram of some of the things there.

I think one of the key points that's been made time and time again is that the shale gas industry here will be different. There'll be less pads. It won't be as invasive as coalescing gas, for example. From the work that I've done talking to people from the United States, looking at the photographs that are available of recent shale gas developments, and looking at google maps and satellite data, it does appear that the landscape impacts due persist through recent years.

I've just put some diagrams up here. This shows the shale gas fields of the United States and Canada. The pink there is from space. That's the flaring that goes with these gas industry and the shale gas there. Just to give you an idea of where those deposits are, and particularly the Marcellus and the Eagle Ford Shale, have been researched quite a lot.

This is a diagram showing the difference between 1984 with conventional gas drilling and occasional fracking that had been taking place in this field, and then the higher density in 2011 from the unconventional fracking, with more pads required.

This is just a photograph of what happens with shale gas in the United States and that's an aerial photograph from Texas from a shale gas field. It's really interesting to go on Google Maps or Google Earth and you can go down to the shale gas regions and have a look.

As was mentioned previously, many of these were conventional fields before they became unconventional. You have to be careful not to look at everything and say "That's shale". You need find out where the more recent drillings have occurred and what well spacing was used in those instances.

These are some photos from Pennsylvania. A local there that was quite frustrated and got up in a plane and made these slides to point to the number of landscape impacts that they were experiencing in their community with thousands of wells, and associated processing plants, and infrastructure through their communities ... And the flaring there.

As recently as 2013, the Australian Council of Learned Academies has put out a report for the Northern Territory context. This looked at the ... This table is referred to by people I've heard throughout the inquire already talking about the tens of thousands of wells required here in the Northern Territory.

This is where they're getting that information from. It's a report put out by FrogTech under the ocular body and they talked to well spacing every 800 metres. Now we've heard from the shale gas companies with potentially new technology that won't be necessary, but certainly we're basing this on



the most recent 2013 report that points to areas, particularly say the Amadeus Basin for shale gas requiring over 12,000 wells.

I'm not saying that this will happen, but this the latest or evidence that the community has to go from. From various deemed scientists here in Australia.

This a sematic put out by industry around this idea that has been spoken about. They call it the Octopus Method, but basically we can go from one pad and drill numerous ways. I think it's useful to look at what the industry's putting out in terms of what that might look like underground. I guess I would just like to point to the fact that if that is in case viable, we haven't seen it elsewhere yet. If that was the method to go forward for the Northern Territory, we would certainly need to do a lot of work to understand the risk of those multiple wells, going out of different directions, multiple pads, oh sorry, wells on pads, and how big those pads would need to be. But also that each one of those horizontal fracks would still need to be serviced with a high level of water, trucks, chemicals, sand, etc.

Again looking at industry to learn more about this idea of well integrity. This is from a 2003 Schlumberger report, they are one of the main oil and gas drillers, have been for a very long time. Their reports are interesting because they sort of just say it how it is. 2003 is obviously prior to the shale boom in the United States, and perhaps prior to when this information hasn't been as publicly available.

As you can see, even after a flawless cement job, the cement can still be damaged by the routine operation of a well. Mechanical properties of casing and cement vary over time. Differential expansion and contraction due to temperature, pressure, or vibration can cause the bond between casing and cement to fail.

The same report has some interesting diagrams, basically talking through what that looks like. They talk about gas migration or annual of flow. They say that annual of flow and sustained casing pressure are significant problems effecting wells in many hydrocarbon producing regions of the world. That would have been in relation mostly to conventional reserves, but I think that it's worth noting that there are concerns expressed by the industry.

As we've heard from the industry, they've been drilling and fracking since the 1940's, for example. These concerns around cement casing have been going on for a long time. I have great respect for engineers and for technology that tries to improve these practices. However, it is an ongoing problem that is still, was in 2003, and has been continuing through a long industry of operation.

These picture just sort of demonstrate why suddenly there is more community concern with that shale gas boom in the United States post about 2009. We're seeing shale gas wells come a lot closer to families, to



homes, and to children. Which is why we're learning a lot more and people are doing a lot more research because there are so many more wells that are impacting on so many more communities.

To go to the paper that was put out by the panel, the background and issues paper. I just wanted to speak to this diagram, because I think there is probably some room for improvement. This was a 2009 industry report as you've said there pointing to the chemical use in hydraulic fracturing. Noting that it's about point five percent chemical additives.

I think what would perhaps be better for the next round is to use peer reviewed science of a more recent report. This one comes from one in 2014, from the United States, that looked through all the data and peer reviewed science on chemicals used in hydraulic fracturing to date. I'll just read that first paragraph.

Uses fracturing fluids that contain organic and inorganic chemicals known to be health damaging. Fracturing fluids can move through the environment and come into contact with humans in a number of ways. Including surface leaks, spills, releases from holding tanks, poor well construction, leaks, and accidents during transportation of fluids, flow back, and produce water to and from the well pad, and runoff during blowouts, storms, and flooding events. Further the mixing of these compounds under conditions of high pressure and often heat synergistically create additional potential toxic compounds. Compounds found in these mixtures may pose risks to the environment and to public health through numerous environmental pathways including water, air, and soil.

That's based more on the more recent peer reviewed science. This also came out just in the last few months. It's a 2017 study. They just looked at four different shale producing areas in the United States, so not all of them, but looks to map the spills and discharges from well sites and shale frack sights. Now in response to this peer review paper, the industry did say that most of these spills were contained on the pads, and that is the case.

However, in this map of ... Interactive online tool that you can also use, but I clicked down to just show the spills where water had been impacted. It wasn't just contained and cleaned up by the industry, which of course, they try and do at every occasion. This maps where there was a measurement of local water being impacted.

Another interesting report that's come out in the last few months is, the complaints data from Pennsylvania that was provided to the Department of Environment, has been made publicly available through threat of information and other journalists requests. I think it's interesting, I'm not saying that this in itself is peer reviewed by any means or proves anything, but it talks more to community concern and why there has been this level of concern around the shale gas fracking industry.



This measures complaints in regards to fracking between 2004 and 2016. The level, the number of fracking wells was just over 10,000 across those three districts. The number of water complaints that happened in those districts was 4,100. Water wells being impacted, it was 41% of complaints, was in relation to water wells being impacted by fracking. Total complaints was over 9,400 complaints by local residents that could have been in relation to noise, interference, other things.

I just wanted to put that up there to give an understanding of why there has been so much interest in this and to point to the fact that whether or not these communities were able to get compensation from the companies. We know that many communities now have their water trucked in or are able to go to a new watering point to access water. We've heard from Queensland through our Lock the Gate Network that there are local churches that are delivering water to people that have had their water impacted after the gas industry has been in their area. We know these things are happening and it's only now that the science is starting to catch up and actually report that peer reviewed evidence of water contamination.

In regards to chemical use, we can also look as I originally said, they've provided the details of their fracking operation at Beetaloo and the chemicals that they were going to use. They've said here, and I won't read it out, but it's available through their EIS that they provided to the government. Then the government put up on the website, which wasn't the way that it was done previously, but the new government said that it would be publicly available, which is where I got this. They use about one percent chemical use for their wells there.

They've listed them here as two options. One being if they use slick water stimulation fluid, and they've listed them there in the tables. I've just taken this out. Or one could be that they were going to use cross linked gel stimulation fluid. They've said that this is an approximate and that they were going to provide the exact details to the government before they went ahead because you need to slightly vary the mixture depending on the shale and the resource that you find. I thought it was just important to mention that, but also important to have a look then and see what was on that list and what do we know about them.

One example is that they're using fumaric acid, which potential acute health effects are known. In terms of being hazardous in case of eye contact or ingestion. Slightly hazardous in case of skin contact or inhalation. We know that the substance is toxic to lungs, mucus membranes, and that repeated prolonged exposure to the substance can produce target organ damage. They're also using siloxanes there, which are potentially persistent organic pollutants. Meaning they are persistent bio accumulative and possibly capable of long range transport.

It's also worth noting that many of the chemicals there and used in fracking in general have not been released for their health impacts to humans from NICNAS. That investigation was called from Queensland coal seam gas. The



federal government is yet to report back on what the health impacts of all of the chemicals used are for human health and also what mixing those chemicals together might do to them. As we've heard from the U.S. studies, what mixing them under heat and pressure might do to them in terms of when they're brought up to the surface as flow back fluid.

Certainly there are reports available online that you can research around health impacts to workers, from either the chemicals, and also from the dust and sand that is used in terms of health impacts there for respiratory problems and otherwise.

The second terms of reference point that I wanted to speak to is around this question of whether or not we need based line surveys to be able to make a decision about whether these impacts are acceptable or not for our Northern Territory context.

The first one is based on surface water and ground water studies. I would certainly argue that these are very important and I've heard throughout this consultation so far that it is being raised as an issue. Certainly we need to learn more about ground water dependent ecosystems and what impacts de watering would have on them and certainly water allocations and natural flows. It's a big issue here in the Territory and so we would want to know how much water is there, how much water is being allocated to existing industries, and how much is available to the shale gas industry. Also intentionally this question of what quality of water can be used in shale gas. We've heard differing reports. Certainly it seems that better quality water is preferable to mix with the other frack fluids and compounds, but it would be good to get more clarity on that.

The other one that's mentioned there is this idea of base line fugitive emissions data. I've put a table here that talks to the measurement of emissions and methane emissions from gas fields, in mostly the United States. I think it's a very, very important issue, goes to fugitive emissions, goes to how much it would cost and where the gas companies could afford to pay if there was a carbon price. Also displays there the level difference between different measurements in terms of how much is leaking.

Certainly in Australia we've heard that the limited amount of studies that have been measuring for fugitive emissions have only measured at the wellhead and haven't been measuring all the associated infrastructure that goes with the shale gas or unconventional gas industry. Certainly those Texas shale gas fields, that's from the Eagle Ford shale, and that was a report done by the American Geophysical Union in 2014.

In the Bakken shale, which is found in North Dakota and Canada, and also the Eagle Ford shale in Texas, shale gas production areas were found to be ten percent and nine percent of production respectively based on satellite data. They were finding from satellites, there was about that much methane as a percentage of total production being lost to fugitive emissions.



We certainly need more base line data to be able to prove for sure that those leaks and that methane is all coming from the shale gas activity. Which is why I think it would be absolutely important to do that work before any drilling or fracking was occurring and before exploration was taking place, so that we could absolutely clearly measure that. The little point on the right there is just that currently the Australian Government says that fugitive emissions from gas fields are point five percent. That's not based on actually measuring it and it certainly doesn't seem to be based on the evidence coming out from actual shale gas fields measured around the world.

The other point for the terms of reference is geological and fault line mapping. This is coming out increasingly as a big issue. Understanding where fault lines are and how high pressure hydraulic fracturing would impact on those potential faults, and whether or not earthquake risks would take place. I've just included some data there in terms of the measurements of earthquakes in Oklahoma, which is an oil and gas rich area, where they have been undertaking hydraulic fracturing. Importantly also undertaking what is proposed potentially here in the Northern Territory, which is that waste fluid re injection into aquifers. Which various previewed scientific papers have shown are linked to increasing in earthquakes. Important for us to know in the NT where the big fault lines, where are areas that potentially aren't appropriate to put these sorts of activities.

Certainly based line health assessments is the final one. This is incredibly important and hasn't been done. It needs to be done both in terms of air quality, but also in terms of the robustness of that community because of the social impacts of these gas field developments and related infrastructure and work camps. We know that typically these gas fields are put in areas of very low socioeconomic demographics. That's certainly been the case of some communities in Queensland, communities like Tara.

People that perhaps, we need to know more about their base line health, but also people that aren't necessarily able to access a level of education that we've been afforded. In terms of understanding more about the risks. Going back to that issue, it also comes to in terms of signing access agreements. We're privileged to be able to look at the signs to understand a full production shale gas field, and what that might entail, whether it be for water or local help. Many communities that are on the front line of these negotiating tables with the gas industry, when they send them out, don't have that background, don't have that expertise, don't have that level of engagement with the scientific community, the legal community, and so aren't afforded a full range of information. Certainly they wouldn't be given a presentation like I'm giving you now that talks through some of the risks that have been found in peer reviewed literature.

To the question of the environmental risk and what is acceptable to the Northern Territory, I would advise that's something that needs to be worked through this year obviously. One that is perhaps for the community to also help define. These are the people that will need to live in a gas field, or have a local tourism or cattle station industry. As we've heard, the gas industry



doesn't support a veto right. It doesn't support people being able to say no to it occurring on their property, which means that they only have to right to say yes.

That is something that we have a differing of opinion, but mostly our opinion is, there needs to be full conversations with local community members and they need to help define what is acceptable or not.

I'll just flick a couple more slides and I'm at red now. [crosstalk 00:27:09] One more slide. So, again this is coal seam gas, we know it's different geologically, but some of the industry impacts on the surface are similar. This was a study done by the University of Queensland, it just went out and interviewed people that were actually living in these gas field regions. It found that agriculture and local business, when they were interviewed with these university researchers, reported that every aspect of their financial human built social and natural capital was worse off after unconventional gas was in their community.

I would commend this report to you. I'll be putting forward a written submission with all of the references that I have provided here today. Interestingly, one thing that we're told a lot from the gas industry is that they will help build roads and help with infrastructure. But interestingly in this case, even the mining and gas workers reported that built capital was worse after the unconventional gas had been in that community. Certainly as did every other sector. I'll leave it there and we'll be able to report more in the written submission.

Hon. Justice
Rachel Pepper:

Thank you very much. Will you be making your slides available as well?

Naomi Hogan:
Hon. Justice
Rachel Pepper:

Yeah, absolutely.

Thank you very much. I'll open it up to questions from the panel. ... Yes, Professor Priestly.

Prof. Brian Priestly:

Thank you very much. That was a very well researched presentation and I think that the references that you've provided will expand quite nicely on some of the things that we'll need to look at. I'm still puzzled by this apparently conflicting evidence about the number of wells and some that are associated with this industry. You showed photographs of what happens in the United States and that seems to be very distinctly different to what we've been told would be the situation here. Are you able to, I don't know whether you can elaborate on that, but respond to that apparent conflict?

Naomi Hogan:

I think it is a real conflict. I think that technology is emerging as we heard from Professor Flaud as well in terms of the directional drilling that they are now able to achieve and how far. But the question is ... Is it tested? Has it been shown to be safe over time? We need to look to examples that are in the recent history of drilling. Certainly that has still been the case that they do require multiple pads and multiple infrastructure on the surface, which does have a large surface impact. Even if it's a small percentage of land, it's



still for tens of thousands kilometres a grid that needs to be accessed for gas development.

I agree it's an important question and I'd certainly like to see more information from the gas industry on what they do expect a production field would look like. I would suggest that they would probably have an idea of that. Even at the exploration phase, some idea of what seams they would be targeting or shale that they would be targeting, and what level of wells, whether it be large pads that are serviced with multiple underground hydraulic horizontal fractures.

We'd need more information up front. I would suggest that we need more information at the earliest stage, whether it be for traditional owners, or for land owners, or land holders to be able to make a more informed decision. Because at the moment, we're hearing from people that have had it on their land, that they're not told about the full extent of production, and how many wells that would involve, whether they be in one pad, seven pad. We've heard anecdotal evidence that people have been told there will be hundreds of wells on their property, but not explained where, or what the impact would be.

I think absolutely we need a more public discuss on that and we need, and I'm not sure about the commercial and confidence issue here, but I think that we need to be able to see over that. To be able to see the maps of what is the grid that they are looking to target. We know those maps exist from Queensland, where farmers found out later after they had signed access agreements. That they then were able to see all this industry guide turned up with a map that showed all of these points on my property. I've never seen this map before and the company had known the map of where they were going to go and indeed did.

Hon. Justice
Rachel Pepper:

Of course, it's very important for aboriginal peoples under the Aboriginal Land Rights Act because the consent once it's given up front to the exploration stage then travels through the entirety of the production stage. If that information is not provided in a transparent manner, then I think it leads to all sorts of disadvantage. Professor Hart.

Prof. Barry Hart AM:

Could I ask you what's Closed the Gates stands on the potential for no go zones?

Naomi Hogan:

Lock the Gate has a strong position that no go zones are a very important thing to have. It builds on this idea, not just a veto right for land holders, but also that we look to aquifer systems. We look to natural flows in the environment and we make sure that critical water supplies in other areas are no go zones. That we look to geological areas where the faults make it look like a complex geological region that might not be safe, that they become no go zones. We really look to science to understand better. We also look to communities to find out more about what their vision for their community is, whether or not that includes a shale gas development there.



What that would look like or whether they, in fact, want to be able to be a no go zone.

Certainly for communities due to the health evidence, we think that any community living areas should be off limits with large buffer zones. To ensure these particular air emissions, but also the higher level of spills around sites can be kept out of areas where people are living, working, or accessing water for them or their stock.

Hon. Justice
Rachel Pepper:

Yeah. Ms. Coram.

Ms. Jane Coram:

Ms. Hogan, thank you for your submission. You've given a lot of evidence based on American gas fields and I'm just wondering, admittedly they're the only example you have to work with, but have you made any analysis of how analogous they are to the Australian setting? In terms of geology, production methods, environmental regulation, population density, infrastructure, because looking at the slide it looks a very different landscape to the ones we're gonna be dealing with here.

Naomi Hogan:

Absolutely. It is a different landscape and those are the sorts of scientific research developments that we need to see and that we haven't seen to date. At the moment we're looking to the United States because that's where they have developed shale. We need comparisons on what were the depths, what are the differences. Overwhelmingly though, the same companies that have operated in the United States, whether it be Halliburton or Schlumberger, are the same ones that are operating here as part of either the coal seam gas industry or the proposed shale gas industry. We can expect that many of the industry practises, the engineering, and the sorts of practises would be very similar.

The regulatory systems are very different across the United States and Canada, state by state. Some have better regulations than others, but all of them have been playing catch up with the industry in terms of having to periodically improve or try to improve regulation based on an industry that wasn't well regulated initially. Based on an industry that had no base line data available and one that started very quickly. Boomed, and has now busted in many areas as well that have been promised a lot and the companies have now left.

One further point on that would be that we don't have a production or commercial scale shale gas industry anywhere in Australia.

Hon. Justice
Rachel Pepper:

Yes, it will be Dr. Jones and then I'll come back to you Dr. Beck. Yes Dr. Jones.

Dr. David Jones:

One question is about one of the points on one of your slides, which is quite an important one where it stated, and I think I captured this correctly, it was a high regulatory burden is not in the shale gas industries interest due to the high cost of shale gas production in the NT Are you prepared to elaborate on that?



Naomi Hogan: I am. This is a slide here put out late last year. It was a meeting of gas industry people and government in South Australia that were talking about the reserves available in Australia. Here you can see that the Cooper Conventional Gas is one of the cheapest available gas resources in terms of the cost of extraction.

I think this is a really important point. It maps various onshore gas fields across Australia. As you can see on the far right, NT Gas is there at seven dollars fifty as the most expensive to extract gas reserve in Australia that they are mapping. They also note with the three stars there. That black tip field, which is offshore, is expected to have a range of about six dollars a gigajoule, whereas seven dollars fifty is the higher cost on conventional plays.

The reason I think that's important is because there's a concern that it's already going to be marginal industry in terms of the profits, which comes back to taxation, comes back to potential royalties, but also comes back to the level of cost burden that companies are willing to take in terms of regulation. Whether or not they can afford the highest quality regulation that, to be honest, we haven't necessarily seen. Certainly not in the United States with some of the problems that have evolved. Whether or not those companies can afford that with the very expensive technology of deep shale hydraulic horizontal fracturing. Potentially needing the octopus going out which we don't know the cost of that, but these are industries our own documents pointing to that high cost.

Dr. David Jones: Just taking a little bit ... on that previous submission talked about ... Australia assets in the event the quality cycle went the other way and what you're leading to is that this might be a marginal industry in the sense of economics and that there could be a higher risk of legacy issue.

Naomi Hogan: Absolutely, I'm used to ... I've seen that in the United States when the oil price went down. Many companies went bankrupt and Bloomberg were reporting that it was easier for these companies to go bankrupt and then restart now that the oil prices crept up again, and have been able to leave behind all of the legacy issues and other issues that they had in regards to their previous company because they were simply able to declare bankruptcy. These are live situations playing out now that would need to be taken into consideration.

Hon. Justice
Rachel Pepper: Yes, thank you. Dr. Beck.

Dr. Vaughan Beck: Yes, thank you. You had articulated very clearly a number of issues and a number of concerns and I think what you were doing through the presentation was calling for clearer information to be made available. You also said that there were potential no go zones and you included geological fault areas and so forth. So going into the future, can you see circumstances where by if this information was provided that there could be a case made for development to occur in the Northern Territory?



Naomi Hogan: I think based on the evidence and the complexities that we're dealing with, it's too early to say. I think there is such a high level of information that is required and I still believe that the gap of information between what the gas industry is saying in their short presentations even here, but certainly to the community or in media grabs or political lobbying is far different the reality of the scenarios that have played out elsewhere. That is something, that gap needs to be brought down so that we can have an honest conversation about whether it be the cost, whether it be the environmental impacts, landscape impacts, so that we can make that decision.

At the moment, I feel like the gap is too large and we're not in a position. So I commend the panellist here today and as part of this inquiry of doing some of that hard work in trying to bring that information in an even playing field that the public can access. I think even after that I'm unsure that we will have clarity within a twelve-month period as to some of those questions that remain. [crosstalk 00:40:02]

Hon. Justice
Rachel Pepper:

One last question.

Dr. Vaughan Beck:

I just got to clarify. Will you be putting in your submission some of those areas where you think the information is a ... we have?

Naomi Hogan:

Absolutely. Yes, some of the research, that could take a bit of time on ground to be able to make those decisions more clearly.

Hon. Justice
Rachel Pepper:

I just had one quick question before we finish. I think you mentioned that there were some regulatory systems that were better than others in the United States. Do? What are those? Do you know? In your opinion.

Naomi Hogan:

I leave that, I know that there are lawyers presenting later today that have done more research than I have. I know that certainly in Alberta there was some improvements in regulation that they mapped there, and certainly one of the key changes that I would put forward is that owner's approve. One of the concern with the multiple court cases that have happened in the United States is that it's almost impossible for your average Joe to be able to prove in a court of law that their water was contaminated by the fracking company, or by the drilling company, or by a spill by a contractor. I think that's an area that needs to be considered as well in terms of regulation.

Hon. Justice
Rachel Pepper:

Thank you very much. Thank you very much, Mrs. Hogan. Thank you.

Naomi Hogan:

Thank you.