Central Australian Frack-Free Alliance – Hearing Transcript

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Alice Springs Convention Centre, Alice Springs

Speakers: Marli Banks, Dalton Dupuy

Marli Banks: Thank you to the panel for this opportunity to address the scientific inquiry into hydraulic fracturing. A little bit about us; we are a community group. Acronym CAFFA stands for Central Australian Frack Free Alliance and we're a community group that's made up of volunteers within the community. We all come together with concerns around the industry of unconventional shale gas and we have joined a group together and we work within the community to voice our concerns and to grow alliance along our community that we are in. We have found that with all of our engagements, which have been through markets, letter boxing, community surveying; we have really been able to pick a mood of the community on this issue. We door knocked in a suburb of Alice Springs, Old East Side, and we were able to return results on an issue on supporting a ban on unconventional gas, 85% against shale gas. Of that, interestingly, only a small proportion, 2. small amount, were actually for the industry and a lot were unsure, that we present on behalf of our community on the concerns of unconventional fracking within the Northern Territory.

Dalton Dupuy: It's an awkward moment in the scientific inquiry when there's no clear scientific evidence either from specific wells or from this shield. Scientific processes, repeatable and demonstrable from an experiment, if that experiment side effects; however, are on the singular circumstance or a singular environment, then whatever negative consequences occur makes the experiment not repeatable but it also makes it fait accompli in terms of the damage that occurs.

Marli Banks: To call on the NT Government to establish a no-go zone for shale gas activities through the drinking water aquifer of Alice Springs in the Amadeus Basin, we see this as a really vital opportunity for us. Locally we have concerns that reach across the whole of the NT but vitally here in the Northern Territory in Alice Springs we are calling upon a no-go zone around the Amadeus Basin as it's vital to the way of life in the arid area of Central Australia.

We ask that the issues' paper expand to include specific section on questions of social licences to operate and whether the unconventional shale gas fracking industry has that licence here in the territory, and we would like to talk to the terms of reference in the inquiry now if that would be okay?

The first point of assessment of risk, to date there's no scientific peer reviewed studies that reflect the risks associated with onshore gas in the Northern Territory. We are lacking baseline studies on ground water, emissions, geological info, line mapping; there's inadequate research, there's lack of transparency, and best available evidence is simply not sufficient to allow even a tightly regulated industry to go forward.

Dalton Dupuy: It would take probably a number of PhD students to get through all of the publications that have been done so far and scientific processes, as you know, is a slow process and often painstaking. Evidence is built step at a time and any research that is done expeditiously or for an expediency, whether it's a public benefit or a private gain, usually has a history of catastrophic outcomes. There's some really classic ones, estimates of the water runoff from the Rocky Mountains; they surveyed the snowfall and the water in 1926, 27, and 28, thought that three years was enough, allocated 50% of the water environmental flows and the rest of it to the jurisdictions around the Grand Canyon. In fact, what they did was they allocated every drop because those three years had twice the number of snowfall and runoff. If we in a singular moment with this aquifer here get the science wrong, we've only got the one chance and I think that, that's probably a pretty strong example of why we are standing here the way we're standing.

Marli Banks: On that, we have a question to take to the inquiry on what assurances that can be given to communities that rely entirely on clean aquifers, that their drinking water will not be contaminated now or into the future? Alice Springs, as you would know is one of these communities and we rely entirely on ground water, and we feel that the risks associated to any risk is too much of a risk so what assurance can be given to communities? We have some references there from drinking water cases of contamination that you can take to for some more information on that.

In the second section, a point advising on the nature of knowledge of gaps within the industry, we feel as we've stated there's inadequate scientific peer reviewed studies. This is peer reviewed studies, as you would know are vital and integral to this process and until relevant information is presented and peer reviewed importantly, this industry cannot be permitted. All works outlined need to address transparency and without pressures to produce documents within realistic timeframes.

I applaud the process; I would also just like to state that I was given notice of this meeting at 10:30 p.m. last night. We as a community group, so the notification of what time our appointment was actually today; as a community group, we've had volunteers letter boxing 10,000 homes in Alice Springs to notify this event today.

I personal am a contact and I've had people calling me today, one particular woman one of our senior Territorians Helen Davidson she's lived in the territory for 45 years, she asked me ringing to say she had been given a notice she's really concerned about this industry progressing in the Northern Territory and I talked to her about how she could engage the process. She

said to me that she's come up against a problem, she's a senior, she doesn't have a computer, so I'm working with her to actually I've offered her contact with me to help engage the process to send through and I have to look that information up of what actually postal address the people that actually don't have access. This is going to be something that I'm sure you're going to come across; we'd like to see that more effort goes towards community engagement on this process to allow for it to be transparent and as engaging as possible.

Dalton Dupuy: Under the same section, number 2 and items A and D, our submission didn't have time to ...

Hon. Justice Rachel Pepper: I'm sorry, what document are you referring to?

Dalton Dupuy: So, we're talking about the document that we presented to you.

Hon. Justice Rachel Pepper: Oh, yeah thank you.

So, that's your submission, yes thank you for telling me.

Dalton Dupuy: It's on page number four.

Marli Banks: Oh, so this is on to point two.

Dalton Dupuy: Yup, point two.

Marli Banks: Oh, yup sorry.

Hon. Justice Rachel Pepper: Thank you Dalton, that wasn't clear. Thank you very much.

Dalton Dupuy: Which is part of the terms of reference.

Yup, yup.

The subsections A and D, and we haven't done a presentation but would like to know if it's possible to do an addenda at some stage about the waste management because the hydraulic fracturing that is done now produces a significant amount of waste water and they basically put it in a plastic lined swimming pool, and then expect it to evaporate and who knows what happens with that. We know what's happened up North with the McAuthur River Mine and we'd like to not see that.

So is an addenda possible?

Hon. Justice Rachel Pepper: Yes, of course, anytime.

Dalton Dupuy: Great, thank you.

Marli Banks: We know that unconventional gas poses one of the biggest threats to the planet. We are seeing increasing amounts of evidence that are coming out, to that clearly states that the emissions from methane are 84 times more potent than carbon monoxide over a 20-year time scale. So up until this point, it's been the link between the emissions at point of supply and actually complete process hasn't been considered. A lot of references are taken to point of supply and not actually taking into account that over a period of time all gas wells will fail. We got some statistics reference to that leading a little further up but it's clearly evident and we're seeing that of the emissions, that it's no longer what was considered a clean gas, a clean fuel for power; we are seeing NASA now currently mapping the world for gas leaks. We can refer to the shale gas fields in America to see what actually future emissions are happening from leaks and the two were emissions ... What was the two? Fugitive emissions.

Dalton Dupuy: Fugitive emissions and leaks from the bore itself.

Marli Banks: So we'd like that to be highlighted as a matter of importance to consider as it's contributing on a massive scale to climate change. We ask that a holistic approach is taken from the underground pressurised chemical extraction to the end user including all processes, by products, waste, and side effects need to be considered. As Dalton mentioned earlier, anyone of those topics would take any PhD student many years to complete and to be putting that into the hands of our community is a really big responsibility. A lot of people feel that actually under qualified to be commenting on such a large issue.

As for gas wells, there's little evidence in the NT on hydraulic fracturing as a part process of gas mining. We've got some references to PetroFrontier Operational in 2012 where showing cases of well failure. The NT Government in 2012 also made comment on those leakages, which we've given reference to as matter of evidence. We ask that indulgence more versed on this area that we have got a mistake on page 6 paragraph 4, it should be conventional not unconventional gas fields in the NT. There are examples of the Mereenie Gas Fields. If Dalton, do you want to talk to that?

Dalton Dupuy: I can just say it might inform this inquiry to look at the conventional gas fields like Mereenie and the pipe line that delivers that gas from that field, which is west of Alice Springs to Darwin and as far as we can find, there's no evidence of either methane leakage that's been tested for nor the pipe line itself. Obvious leaks, which effect the commercial aspect of those are clearly addressed but when they're unseen and untested for, we have no idea and the evidence is pretty scant.

Access to that is through private corporations and that of course makes it somewhat problematic as a result of that because I'm one of those that believes that publicly funded research and researchers tend to have a high level of reliability and reduce bias compared to industry based research.

Marli Banks: We understand that we're talking about a conventional source and it must be noted that we're clearly drawing the connection between the leakages as

a source that we're talking about transportation of gases and with the expectation of the industry to expand over 80,000 wells in the Northern Territory. That would be sizable amount of gas transportation so we'd like just to draw and clarify where we understand the difference between conventional and unconventional but it's a matter of utilising the already present resources to gain an understanding of leakages for future emissions and for point of extraction gas leaks.

Dalton Dupuy: I think that probably the pro-case and the anti-case in terms of fracking in an inquiry's got to deal with the cherry picking that goes on from the different sides of the story and that cherry picking and data, of course, is problematic for me and I find that it really takes energetically a lot of time to balance the personal preference to what's actually being discovered and identified. I find industry results tend to be cherry picked significantly more than the community. It's a lot to ask a community to come up with an argument and with evidence, scientific or not, about this sort of industry when we're all volunteers and industry or publicly funded researchers have another opportunity and greater resources.

Marli Banks: We see with that as well based on what is available currently. We have failed to locate information that is site or field specific. For empirical data this is important particularly Northern Territory's a virgin landscape and it's really important to have site and field specific information. Again, as Dalton highlighted, a publicly funded, publicly available research project for all unconventional gas bores is required to definitive findings. There's going to need to be bigger time allowances to give true science.

Dalton Dupuy: We got to highly regulated in Australia, the uranium mining industry, and yet we deal with their accidents and their leaks and their contamination regularly and publicised or not, and it's an indication of mining somewhat cavalier approach to the environment and expecting the community to soak up their leftovers. That's an issue. At least an issue for me. There's a further reference and I'll leave with this inquiry and it's from the environment agency in the UK and it tends to be a compendium of findings that they've done in England. There jurisdiction's quite a bit different than ours because it's not an arid environment like this one is or semiarid and as a result of that, it's probably only useful in terms of sideline evidence.

Hon. Justice Rachel Pepper: Thank you.

Marli Banks: Points three and four, if we can just ask that we include a response to points three and four together. If we do, that's a change that we can amend and put forward but if we can just go onto page seven of our presentation, we'd like to address points three and four together. In that, we addressing the environmental risks and for every risk, identify the methods, standards of strategy, and whether there are such methods that can reduce the levels of risk. We firmly believe there is no acceptable environmental impacts or risks that would ... What's the word I'm looking for?

Dalton Dupuy: Allow.

Marli Banks: Allow, thank you ... For this industry to go ahead and we're not willing to accept, sounds like a bit of a threat but, any risks to our water supply and our aquifers or an industry that assuredly risks contaminating our climate change.

Dalton Dupuy: Primarily because we have a singular water supply. There's one water source here. There's no surface water.

Marli Banks: With surface water actually, I was doing quite a bit of reading on water last night. From the information that we have on water, which may I state is limited. The Mereenie is a basin within our aquifer, our aquifer is ginormous. We have basins ...

Dalton Dupuy: Amadeus Basin.

Marli Banks: Amadeus Basins, little pockets within the municipality of Alice Springs there's at least six water bores; they all have different uses. The town basin for an example, leads and fills directly from ground water from rain. The water within that bore is actually not of drinking quality and it's used for irrigation of, and actually supplied water to our natural landscape particularly the Red River Gums. We have many pockets of basins and from all the information that I can read, which available through the town council and the Northern Territory Government, there's not enough information that actually outlines what amount of water that we have; how that fits into areas of drought.

The empirical data goes way back to the 70s but the scope of Central Australia is widely varying. We can have decades of dry and we can have runs of wet. There's no information in the water studies that are out there that actually reflect how much water is definitively available to the Alice Springs municipality let alone on where the Amadeus Basin access is right after Hermannsburg. It's a really big basin, it pretty much covers probably 1/8th of the Northern Territory. May I add that it has ear marked for an excessive 12,000 wells so it's quite a threat for our drinking water catchment.

In relationship to fugitive emissions, we feel it's too late, this industry and now it's far too dirty. Pumping harmful chemicals into the ground can release natural occurring substances, which is fugitive emissions of lead, mercury, uranium into surrounding water and soil. We know that methane is 20 times more potent as a source of global warming and a tonne of carbon dioxide. Despite the decade of widespread fracking in conventional gas in Australia, no comprehensive analysis of fugitive emissions has been published that we're aware of and this would be imperative. We need actual measurements.

We can look to the United States for this information and we can see that 25 times higher than assumed figures in Australia is National Inventory of Greenhouse Gases. It's unfortunate currently, the Australian government and the Australian gas industry continue to assume that future emission in

fracking and unconventional gas a low rather than a collective evidence, which is showing the country and we strongly believe there's no risk worth jeopardising our water, including economic growth because we can't have economic growth without a safe water supply. We do not support an industry that blindly risks dangerously levels of climate change.

On point five, identifying scientific technical policy regulations and requirements for acceptable levels. Again, on climate change and the risk toward our aquifers, we feel strongly ...

Yeah? Did you say pause?

Hon. Justice Rachel Pepper: Five minutes.

Marli Banks: Oh, five, pardon me I thought that was pause.

We feel this industry must not be allowed. It's the most extreme measure to extend this fossil fuel industry for generating electricity solely, expanding and mining more and more extreme, and difficult to extract methane gas, will continue to warm the planet and produce discharges affecting water courses' in the oceans.

On point six, identifying priority areas for no-go zones, we as a group call for a complete ban on unconventional fracking in the Northern Territory and ask all aquifers in the NT are put off limits. We in Alice Springs as I outlined, have a limited water supply and we draw it from the Amadeus Basin. It's unsure the information exactly how much water we have left and it's imperative to life, not only for humans but ecology, for everything, water is vital. Also, with the expectations of expanding our inland populations; therefore, extending agriculture and other industries, this estimate will tighten on our water usage and we can't risk contamination or drainage of our aquifers in order to meet the fracking industry, which we know is very water intensive.

Dalton Dupuy: Then you would already have those numbers anyway but it's quite significant. It's a thousand cubic metres of water per well, per frack and they are fracked a number of times, probably reducing scale as it gets fracked more frequently but it's still a lot of water for a desert.

Marli Banks: In conclusion, we the members' representative of the members of CAFFA, we're seriously concerned that fracking, unconventional gas extraction maybe permitted while there's no scientific evidence to determine the nature and extent of the environmental impacts and risks. We strongly oppose the industry because of its threat to our water aquifers, our water supply, and our way of life as well as its contribution to global warming and what's going on contributing to climate change. We believe there are no risks or impacts worth jeopardising our water and our health, our children's future, and the future of our planet.

On closing, a quote from Naomi Klein, "Climate change is an integral theft." We feel that the fracking industry in the Northern Territory would be a significant contributor to the theft of our environment and nothing's worth that.

Hon. Justice Rachel Pepper: Thank you very much and can I thank you and also commend you for putting together this paper with all of its footnotes and resources and citations, the panel's very grateful for that. I just had one, I guess a couple of points, in terms of the social licence issues that you want the panel to consider. Yes, I agree the social licence to operate is a very important matter that the inquiry has to look at but we have tried to identify what we think are the risks in that regard or the issues in that regard at page 21 and 22 of the issues paper. What, if anything, have we left out? Now obviously, those are stated in fairly broad terms but I must say under social impact, we see the social impact as really, I guess another way of saying social licence to operate. Is there anything there that you feel that we've missed out on?

Marli Banks: If I can just explain the timeframe has been very tight for us, I'm a business owner, I'm a mother of two and we've been working pretty hard to make this ...

Hon. Justice Rachel Pepper: No, but that's all right, that's fine.

Marli Banks: ... But just to explain that we would be really happy to comment to further on these social aspects if that's something that we could work with the panel ...

Speaker 3: Absolutely, just put it in the submission paper anytime.

Marli Banks: ... to further and to outline CAFFA has come about with concerns from community members. We talk broadly and a lot of people don't understand the term social licence to operate. We see it as actually like thumbs up from the community as a matter fact for the support. So what we've seen from our interaction through community knocking on people's doors, returning results as high as 85% with only 2.4% against or for the industry.

Hon. Justice Rachel Pepper: That was in one suburb, was that right?

Marli Banks: That's, right and that was all done by volunteers. Alice Springs is a town of 25,000 plus, it's a hugely intensive project that we were able undertake through a suburb.

Dalton Dupuy: The end number is about 620 people were questioned in about 550 households.

Hon. Justice Rachel Pepper: Thank you.

Marli Banks: It gives a good scope too if we look at averages.

Dalton Dupuy: I'll make a couple of comments about social impacts just from a quick glance of the headings. The footprint of a fracking bore is roughly a hectare as far as I can judge and they're fairly frequent and Marli's talked about 12,000 of them being supposedly considered for Central Australia.

Hon. Justice Rachel Pepper: Where did you get that figure from?

Marli Banks: We could provide, I'm not sure if we have that there but I would be happy to provide a reference to you.

Hon. Justice Rachel Pepper: That's quite important so that would be good, thank you.

Dalton Dupuy: It affects the landscape just from a term called amenity and the term amenity is about what's it looks like and how does it feel, and that's to the neighbours and tourist operators, and residents and a whole number of circumstances. That would certainly be a social impact that I would know about. The fly in and fly out phenomena of many of the mining industry is a fairly well known phenomena in terms of social disruption and disruption to family and community. That's been an aspect that's been presented in a number of environmental impact statements that have been reviewed by the parent organisation of CAFFA. I've done most of those reviews. That would certainly be another aspect to be considered.

The other social impact, I suppose, has to do with what do we do with tonnes and tonnes of gas being pumped through a town, and or near a town, and how does that affect how we live and how we don't live? Those are subjective questions and there quite different to a scientific inquiry because it turns about well, how does it feel to be here? Is this an exploited landscape? Is this a landscape that I want to be in? Is this a contaminated metaphor for how we've treated the planet generally? I mean, to me there's a whole bunch of issues associated with that, some of them obvious and some of them physical, but some of them are quite metaphysical and quite remote in terms of our own perceptions.

Hon. Justice Rachel Pepper: Anyone else have any questions?

Yes, Dr. Beck.

Dr. Vaughan Beck: Just a couple of clarifications if I may. I think you said all gas wells will fail, I'm not sure whether I interpreted that correctly but if you did, I'm just wandering if you have some evidence for that.

Dalton Dupuy: I wrote that line and it's an inevitability. Steel bores, steel pipes; cracks, splits, rusts, wears out, abrades, any number of things and ultimately every bore with fail and it's just a factor of time, it's the factor of when not if.

Dr. Vaughan Beck: Is there any references that you have for that or it's just your considered opinion?

Dalton Dupuy: I mean; we can do that if you'd like but it's more of empirical data than it is a specific research project.

Marli Banks: I think I can provide something. We don't have it in here but I remember; so this has been a jointly worked on document and there was at one point we were talking about statistically so one and three wells fail over the first 20 immediately then ...

Dalton Dupuy: Six percent fail in the first 10 years.

Marli Banks: Yeah, and so we can provide some information, we'll be happy to do that.

Dr. Vaughan Beck: That would be very helpful, thank you.

Hon. Justice Rachel Pepper: Yes, Dr. Jones.

Dr. Vaughan Beck: Oh just, you mind if I ...

Hon. Justice Rachel Pepper: Oh, I'm sorry sir, my apologies.

Dr. Vaughan Beck: Yeah, no sorry, it's just a few other comments.

I think you might have also said that there is no data on gas used through to final use, I think you were talking about up from extraction through to distribution, I think you said there was no data on final use, is that correct?

Dalton Dupuy: No, it was asking that the inquiry consider the whole lot.

Dr. Vaughan Beck: Oh, I see, okay, fine.

Thank you.

Hon. Justice Rachel Pepper: Yes, Dr. Jones.

Dr. David Jones: I know that the current industry to the south of us is a conventional gas extraction industry but it is in the Amadeus Basin and I was wondering what the perceptions of your organisation were to that industry as it now is and whether there are concerns about it in relation to the very aspects you've been talking about in terms of water use, aquifer impact, and things like that?

Marli Banks: It's a complete divide between conventional and unconventional fracking. Currently the gas that's extracted out of the five gas fields in the Northern

Territory this region, they're all conventional sources. The methods of extracting that gas is vastly different and to compare conventional to unconventional gas, does a disservice to either industry. We don't have the evidence for shale gas and the ones that we do have in the Northern Territory have shown high rates of failure.

Dalton Dupuy: The difference is, is that in a conventional gas mine, you probably know this, is they just put a tube down into a gas-bearing deposit and the pressure, either by pressurising it with water going down in there or another substance mixed with sand, allows the gas to rise to the top and then be extracted.

Unconventional gas mining goes down, turns, and goes along and then explodes the rock that has the gas locked up inside of it. Hence it's creating what they call fugitive emissions and, which can percolate through the different layers in the crust of the earth to reach the surface in many cases and that's where an alliance or a similarity between coal seam gas mining and shale gas mining are similar because they both do that.

But that's the difference between the two techniques. One just taps straight into ... There's a steel pipe in maybe several layers in a conventional gas bore that allows the gas to go up and protects it from the water around it. Ultimately, those will all fail and that's just the nature of putting manmade things back into the environment. They return to sort of their source in terms of breaking down at a molecular level if you prefer but that's what happens.

The unconventional one is far more volatile operating at 1200 psi. There's a whole range of the industry numbers that can provide that to you and that's how that tends to operate and hence, pipes fail pretty significantly at 1200 psi, pounds per square inch, or if you'd like there's a metric equivalent. That's part of what the issue is for us.

Dr. Vaughan Beck: Can I just perhaps follow up on a little because you've articulated very well the differences between conventional and unconventional gas but in the case of conventional gas in the Amadeus Basin, I presume that those pipes go through an aquifer and I'm just wondering how CAFFA foresees that well or tube going through an aquifer in the Amadeus Basin as being appreciating there are substantial differences between conventional and unconventional but there's still presumably a pipe going through an aquifer in the Amadeus Basin or several because you've got several wells there.

Dalton Dupuy: They operate it at significantly lower pressures, which is one of the issues of course, which makes them safer. The second part of it, is there's no data. There's nobody surveying the methane leakages from those bores and establishing that in terms of public interest.

Marli Banks: I see the fugitive emissions is a clear difference between the actual extraction method so rather than going straight down into a pocket of gas and releasing that gas through pressure, we're talking about drilling down

five kilometres horizontally, turning left or right, then making a vertical drill either direction, whichever direction and then pumping chemicals and exploding rock to agitate the gas out. That's a largely different process we're talking about. Fugitive emissions actually agitating surface and releasing gas from the pockets, which we know it's trapped within shale rock and that hasn't been measured either.

Hon. Justice Rachel Pepper: Yes, Dr. Andersen.

Dr. Alan Andersen: Andersen. As a terrestrial ecologist I've got a particular interest in terrestrial ecosystems and biodiversity, so I was just wondering if there are any particular issues there that you might to identify as concerns?

Marli Banks: I would like to understand your title a bit better being a terrestrial ...

Hon. Justice Rachel Pepper: So would I if that helps.

Marli Banks: ... in order to answer the question.

Dr. Alan Andersen: Understand my interest in me?

Marli Banks: A little bit more about you ... Yes, sorry I don't understand your title.

Dr. Alan Andersen: The plants and animals on the land.

Marli Banks: Yeah, interestingly through the process, Dalton I'm sure can comment, but interestingly with there's not enough information on and measurement that's come out about actually the water courses in relationship to the environment ecology and I haven't found information. Actually the information that I've found through the Northern Territory Government and the town council actually points to the fact, I believe I reference it somewhere along here, actually that ecology hasn't been considered. I might not have of referenced it but I certainly read it last night and I'd be happy to provide you that particular comment from the Northern Territory Government's latest 2016 water report that talks on the lack of information on the ecology of our ...

Dalton Dupuy: I can talk a little bit more about it. All the terms I've referenced for environmental impact statements as commissioned by the commonwealth, do not even include invertebrates. If you review an EIS for a mine like Nolans bore, which is north of here at Aileron, there is no consideration of what invertebrates provide or takeaway or what their density is or any of the population numbers or any of that stuff so, there's a real absence of understanding in terms of that whole group of life on this planet.

In terms of mammalian and avian species, and how they've been affected, I can probably refer you to some of the gas fields in the United States that look like kill zones and where there's been significant effects of methane gas that's leaked up through either the land or through the bores and then had

a down wind phenomena. It's not something I carry around as a reference inside my head but we can certainly have a look at digging it up for you.

In terms of botanical species, those probably have more to do with sensitivity to some of the specifics that are associated with hydraulic fracturing and in terms of what's in the soil itself. The language groups of this country, this first nation people here, they don't believe in mining full stop traditionally because they said if it's in the ground, it's in the ground for a reason. I sort of am of the same position as that and if it's locked up in there and it's cadmium or if it's mercury or if it's lead or if it's any of things that are toxic to living species, leave it there but unfortunately the process that's been identified as unconventional mining doesn't do that. If it's toxic to the plant because of what's underneath the soil there and it percolates through the soil and then it can actually wipe out a whole area, from my background, miscapes that went from several hundred miles as a result of that sort of activity.

The answer is, it does have an effect, what is it? Not well measured, not well identified but there is some evidence and it's from the kill zones around the gas fields in some of the parts of the United States and probably in West Texas because that tends to be a more similar environment than other places that ... Say like Pennsylvania or Wales.

Marli Banks: However, we're talking about a different continent and it's not site specific to here so we just draw on that but the evidence for the impacts onto flora and fauna and ecology here, there is insufficient baseline studies, peer reviewed baseline studies.

Hon. Justice Rachel Pepper: Any other questions?

Prof. Peter McCabe: Picking up on that point you made several times a comment that it would be good to see more publicly funded research and I guess as a university professor I'm not going to argue against that but ...

Dalton Dupuy: We'd like four more of you.

Prof. Peter McCabe: How much, you know, can we ever do enough research or is this something that's just a delaying thing? I mean, if you look at other debates like global climate change and look at that debated around the world, often politicians will say, well we need more research and it's use it as a delaying tactic. What sort of timeframe do you think that we could get to a point where there would be adequate research?

Dalton Dupuy: How long is a piece of string... I mean, you would know in your own field, and I don't know what that is, that scientific research is a slow process and if it's thorough and it does a good job there become a point at which probabilities are pretty high. I'd say the probabilities that fracking is a safe practice is probably not so high because the research has been expeditious, it's been industry directed, it's been ... There's a whole range of associations with it that limit its lack of bias and its authenticity really. I think that has to

do with, and you would know in your own field, that there are those researchers that you trust their understanding and interpretations of the results is better than you do others because of the phenomena of who and what we are. Part of that's the story for that and I think still the answers, how long's a piece of string, but at this stage to hasten an inquiry into something that can risks of water supply for a significant part of a geography or jurisdiction seems a bit premature to me.

Hon. Justice Rachel Pepper: Might a draw it to a close there. Thank you very much both of you for attending, Mr. Duprey and Ms. Banks, and that draws to an end close of the mornings formal sessions but we're now well into the afternoon. Thank you very much for your time.

Marli Banks: Thank you for having us.

Dalton Dupuy: Thank you for the inquiry too.