STANDING COMMITTEE ON ENVIRONMENT AND PUBLIC AFFAIRS

INQUIRY INTO THE IMPLICATIONS FOR WESTERN AUSTRALIA OF HYDRAULIC FRACTURING FOR UNCONVENTIONAL GAS

TRANSCRIPT OF EVIDENCE
TAKEN AT PERTH
WEDNESDAY, 12 MARCH 2014

Members

Hon Simon O'Brien (Chairman)
Hon Stephen Dawson (Deputy Chairman)
Hon Brian Ellis
Hon Paul Brown
Hon Samantha Rowe

Hearing commenced at 10.49 am

Dr EMMA CROAGER,
President, Public Health Association of Australia, WA Branch, sworn and examined:

Ms JESSAMIE GODSELL,
Advocacy Committee Member, Public Health Association of Australia, WA Branch, sworn and examined:

The CHAIRMAN: On behalf of the committee, I welcome you to this hearing. Before we begin I must ask each of you to take the oath or affirmation in turn.

[Witnesses took the oath or affirmation.]

The CHAIRMAN: You will have signed a document entitled "Information for Witnesses". Have you read and understood that document?

The Witnesses: Yes.

The CHAIRMAN: These proceedings are being recorded by Hansard. A transcript of your evidence will be provided to you. To assist the committee and Hansard, I ask you to quote the full title of any document you refer to during the course of the hearing for the record. I remind you that your transcript will become a matter for the public record. If for some reason you wish to make a confidential statement during today's proceedings, you should request that the evidence be taken in closed session. If the committee grants your request, any public and media in attendance will be excluded from the hearing. Please note that until such time as the transcript of your public evidence is finalised it should not be made public. I advise you that publication or disclosure of the uncorrected transcript of evidence may constitute contempt of Parliament and may mean that the material published or disclosed is not subject to parliamentary privilege. Dr Croager, would you like to make an opening statement?

Dr Croager: As branch president I am here along with my colleague and fellow committee member Jessamie Godsell representing the Public Health Association of Australia. For ease we will refer to our association as PHA. PHA is recognised as the principal non-government organisation for public health in Australia and works to promote the health and wellbeing of all Australians. We are a national organisation comprising around 1 900 members and we represent more than 40 professional groups concerned with health promotion at the population level. We have a key role in advocating for the best possible health outcomes for the community by working with all levels of government and other agencies to promote key policies and advocacy goals related to public health. PHA believes that the hydraulic fracturing for unconventional gas, or fracking, has the potential to be one of the most significant public health and environmental issues facing Western Australia. We thank you for the opportunity to appear before the committee.

Although the impact of fracking on health did not appear as a specific focus of this inquiry, the issues being investigated in the terms of reference have significant implications on public health. While there is a dearth of conclusive evidence about the health and environmental effects of fracking, there is emerging evidence of a range of public health concerns. These include groundwater and surface water contamination and reduced water availability associated with the use and/or release of known carcinogens, endocrine disrupters, uranium, heavy metals and other chemicals in the fracking process. Even last week it was revealed that coal seam gas exploration has contaminated an aquifer in north western New South Wales with uranium levels 20 times higher

than safe drinking water guidelines. Other health concerns include air pollution and climate change associated with the fracking process and, significantly, the delay in the uptake of renewable energy because of the use of unconventional gas. There are direct effects on the health of workers and nearby residents as well as the environment that surrounds the fracking operations. There is also the potential for secondary and flow-on effects, particularly on Australia's future capacity to provide drinking water, which is a grave concern to PHA, and on our ability to support agriculture and livestock to provide food for ourselves and for export. In addition there are other issues, such as mental health and wellbeing, bushfire risk and future government liabilities, which are all important issues that need to be included when accounting for the effects of the fracking of fossil fuel. Currently there is not enough evidence to provide a clear picture of the health implications that will accompany the proposed expansion of Australia's unconventional gas industry; indeed, there are still gaps in our knowledge that need to be rectified. Other risks are inherently uncertain due to the complex systems and interacting health pathways. But importantly, an absence of evidence of health implications is not evidence of absence. The uncertainty surrounding the health implications of unconventional gas is greater than that surrounding any other energy choice. Therefore, the precautionary principle should be adopted on the basis of health risks alone. Additionally, implications for environmental impact and climate change also indicate its unsustainability. It is really misleading to compare unconventional gas production with coal. Coal is known to inflict serious damage on human and environmental health and is a poor benchmark. This comparison also obscures the unfavourable comparison of unconventional gas with renewable energy choices. PHA has a strong desire that Australia's energy future focus is on clean, renewable energy. As outlined in our submission, we recommend that the government take a comprehensive approach to addressing public health concerns regarding fracking in Western Australia. Regulations that take a precautionary and adaptive approach should be adopted. Protecting workers and community health requires the involvement of public health professionals in assessing fracking activities. This should be a priority to ensure that the planning and policy approach takes into account the uncertainty around the effects of fracking. Western Australian public health considerations should be formally included in policy decisions relating to fracking. The framework for the role of public health in decisions about fracking that were recently developed in the US should be considered for adoption in Western Australia. Robust technology and best management practices should be employed at all stages during the fracking process to prevent ground and surface water contamination and minimise air pollution and monitor the impact on public health. Health impact assessments should be conducted to systematically and comprehensively evaluate the impacts to health of fracking in Western Australia.

Our organisation's final concern, which we want to bring to the committee's attention, is that the Health Act 1911, due to its age, is limited in its capacity to be applied proactively and on a risk-management basis to issues such as this. We are concerned that a draft public health bill containing provisions to clearly define the Department of Health's role and provide with it the necessary risk management powers has not yet entered Parliament. Currently we are relying on interagency agreements rather than legislative power to govern this issue. An updated public health bill needs to be passed, or at the very least there should be an MOU between the Department of Health and the Department of Mines and Petroleum, as outlined in the Department of Health's submission to this inquiry. Thank you.

The CHAIRMAN: Thank you very much for that, Dr Croager, and for your previous submission. I think my colleagues and I will be framing some of our questions about your recommendations that you have framed in the submission, and you have already touched on that as well.

I have already thanked you for your submission and for coming in today, but by way of continuing that two-way exchange, there is one matter that has come up before with others that I want to clarify. It might reassure you and your members. The terms of reference for the inquiry are the implications that hydraulic fracturing for unconventional gas will have for Western Australia,

including the several points we made. That means that our terms of reference are a little broader than some stakeholders at first recognised. I hope that reassures you; and, in any case, I want to reassure you that our committee has received your submission in its entirety, because it does address the sort of things we want to address. We are glad you did not limit yourself in anyway.

You mentioned that there are all sorts of occupational health risks and other considerations that regulators and others must take in mind. How many of those considerations are already considerations for mining and petroleum activities or is there something extra about fracking operations that we need to look at?

[11.00 am]

Dr Croager: That is a good question. In terms of my experience, I cannot advise what regulations are in place in other aspects of the mining industry, because that is outside my area of expertise; but I can certainly take that part of the question on notice and find out. From a PHA perspective, we have concerns about a number of key areas, but the main one is the considerable amount of water that will be used during the fracking process. Some of this may have been used in coal seam gas that has been carried already, but an expansion into other areas of fracking will obviously take a considerable amount of water. We in Western Australia already know that water is at a premium and that we need to do our best to protect our water supply. The main concerns for us are ensuring the protection of aquifers and ensuring that proper regulations are put in place so that the industry is safe, particularly in its use of fracking fluids. I am aware that a number of different types of chemicals are used in the fracking process specifically. We know that some of those are carcinogens and that some of them are endocrine disrupters. If they get into the water supply, they impact on not only human health, but also the environment, mammals and other species within the environment and they cause significant effects such as cancer, birth defects, developmental disorders and other issues. The other concern about this particular industry is the amount of silica or sand that is used in the process. Silica itself has been classified as a group 1 carcinogen. We know that it causes lung cancer and it also causes a condition known as silicosis, which is inflammation of the lungs. The significant increase in the amount of sand that will be used in the industry has the potential to impact on workers' health. I imagine that precautionary measures are in place in other industries that use sand and chemicals. They need to be applied in the fracking industry. We have seen great examples of how drilling is having a significant impact on communities in the United States—not necessarily on the workers, but on the environment in which the drilling occurs.

The CHAIRMAN: I think you acknowledged in your last comment that some of the hazards that might present for workers involved in dealing with chemicals for fracking might also be handled by workers in other applications. That point is taken. I think one of the themes in your submission is to make sure that the same precautions that are exercised elsewhere are exercised in fracking operations.

Dr Croager: For the workers, definitely. They will be exposed to toxic materials and chemicals and that is from not only from the process itself, but also the ground water that is recycled when it comes back up. Obviously airborne silica and radioactive material comes out of the ground. At this stage the risks posed to workers by fracking is really unclear, because the industry has not been around long enough. The regulatory processes in place in the United States are enough to protect workers. If the industry goes ahead, we would like to see the same regulatory processes given serious consideration.

The CHAIRMAN: As you pointed out, there is history and experience in, for example, the United States and elsewhere around the world that we in Western Australia must learn from. I think you would support that—if others have made mistakes, we do not want to repeat them. However, I notice that in one of your recommendations you refer to a framework that has been developed in the US for the role of public health in decisions relating to fracking and you recommend that it should be adopted in Western Australia. Can you tell us more about that recommendation?

Dr Croager: We are keen that it be considered for adoption in Western Australia. A lot of work has been done by the American Public Health Association in putting the framework together. It is actually based on a framework that was originally put together in response to climate change. The reason that it applies to unconventional gas is because climate change and unconventional gas are industries or areas that are characterised by trade-offs between economic growth and environmental protection. We have submitted a document entitled "Comment and Controversy: Public Health and High Volume Hydraulic Fracturing". It has a lot more detail about the framework, but in summary it is basically five public health perspectives that inform the response to climate change that can be applied to the fracking area. This covers prevention, so as I discussed previously, it takes a precautionary approach, which is the approach that should be adopted in the face of uncertainty, particularly in areas where there is the potential for long-term environmental and health impacts. It covers risk management and refers to including public health professionals in efforts to manage risk and putting regulatory systems in place that adequately anticipate and respond to risk or protect against it. It also refers to co-benefits, which are results that occur when actions yield benefits in multiple areas. For example, if preliminary monitoring is put in place before the fracking is carried out, when we collect baseline data from private wells we might find problems with people's private wells in that their water supply is not suitable for them to be drinking. Once we start monitoring there is the potential to identify other public health risks that we can respond to that are not associated with the fracking process. It can also lead to community partnerships being forged to address issues and these partnerships may tackle other local public health problems. The fourth part of the framework looks at the economic impacts. The paper goes into a lot more detail, but in summary it looks at the long and short-term costs and benefits. It covers things such as the boom-and-bust cycle, which is quite important as we move into the future. It also considers the ethical issues of the industry on our future generations and on vulnerable populations and from a social justice perspective.

The CHAIRMAN: The Department of Health public health directorate has appeared before us—I am sure you will read that evidence with interest—and has shown a determination to be a positive contributor to the processes. From your organisation's point of view, is that enough representation from public health or is there a need for further avenues of input?

Dr Croager: We very strongly support the Department of Health involvement in this process. There is already good collaboration with the Department of Health and the Department of Mines and Petroleum, and we obviously support that. It would be good to see other public health organisations contribute to the process in a consultative manner, however that may be. Obviously I cannot speak on behalf of our national office, but it is something that we are interested in being a part of. I have great faith in the Department of Health if it is set up with an MOU and in the right way. It would be even better if we had a public health act.

Hon STEPHEN DAWSON: In your opening statement you referred to chemicals commonly used for fracking. You also refer to that on page 7 of your submission. You go on to say that some of the chemicals have already been banned in parts of Australia. Can you provide more information about the banned chemicals; and, if not, can you take the question on notice? I make the point that in our public hearings so far we have been told that fracking fluids contain many items that are already found in households. I am interested to hear your evidence that some of the chemicals used have been banned in parts of Australia.

[11.10 am]

Dr Croager: I cannot at this moment in time specifically speak to what those chemicals are, but I am happy to take that question on notice. From the Public Health Association's perspective, Australia is a bit different from the United States in that we do publish the long list of chemicals used in the fracking process. The Department of Health has asked that the chemicals be disclosed. I am not fully aware of the level of that disclosure. Certainly the amount of chemicals used is not

disclosed. The evidence that we used in the submission refers to chemicals used in the fracking fluid. Some of those are endocrine disrupters. The concern for us is not just the chemicals used and whether it is okay that some of those chemicals are used in household products; rather, it is the volume of the chemicals that are being used. We did a back-of-the-envelope calculation, and when one considers that a single well has about 0.5 per cent of chemicals as the combination of water, sand and fracking fluid in a fracking mix, if one works that out by weight per volume, the 0.5 per cent of chemicals is five tonnes of chemicals per 1 million litres. If a typical well uses between 35 million and 45 million tonnes of water, we are talking about between 175 tonnes and 225 tonnes of chemicals per well that is being pumped into the ground, which is a mixture of endocrine disrupters, carcinogens and other chemicals that we mentioned in the submission. On top of that the amount of fracking sand that is used, which is 9.5 per cent of the volume, is a significant amount of sand and it has the potential to create harm for not only the workers, but also surrounding communities because of the dust that is produced. Does that answer the question?

Hon STEPHEN DAWSON: Yes; but if you would not mind, can you take the other elements on notice?

Evidence we received from an organisation suggests that the chemicals that some companies are working on to use in fracking fluids may be better for the environment, but they do not want to make public what is in those chemicals because of commercial-in-confidence or because somebody might steal their IP. At this stage, the Department of Mines and Petroleum is told what chemicals are being used. If the Department of Health were used as well, would that allay your fears? Cases of commercial confidentiality are hard ones for the industry because there is a lot of fear in the community. If in those cases the disclosure was made to the Department of Health, would that allay your organisation's fears about companies hiding what is being used?

Dr Croager: Yes, to some extent. Again, coming back to the point about chemicals, in terms of that propriety process I think it is important that there be a transparent process for not only us, but also the public; people need to know what chemicals are being used. The specific volume of chemicals used within that component of the fracking fluid is obviously propriety, but we encourage disclosure of the chemicals that are used so that we have the knowledge that will allow us to adequately respond in cases of contamination. It is the volume of the chemicals being used and the volume of the chemicals that will potentially contaminate the water supply that are big concerns and a worry to us. If water supplies become contaminated, it is hard to undo that contamination. That is our major concern about the chemicals and the fluids.

Hon STEPHEN DAWSON: I am not sure whether that has helped me. There is commercial-in-confidence on one side and disclosure on the other. How do we marry the two together to give the community confidence while letting the industry control its IP?

Hon SAMANTHA ROWE: Would you be happy about the level of transparency if the Department of Health were also given the information?

Dr Croager: At the very least the Department of Health should be given that information.

Hon SAMANTHA ROWE: Do you think it should be publicly available?

Dr Croager: I would prefer it to be publicly available and the Public Health Association would prefer it to be publicly available. We do not need to know the detail of the volumes of the chemicals used in the process. If the industry can make it available to the community, the community will feel more comfortable that information is being disclosed in a real way.

Hon SAMANTHA ROWE: Is it correct that you are concerned about well integrity failure?

Dr Croager: Yes.

Hon SAMANTHA ROWE: Would strong and comprehensive regulations around the integrity of wells allay your fear of aquifers being contaminated?

Dr Croager: To some extent. The risk of well-casing failures and spills and other accidents that are involved in the fracking process cannot be dismissed. Based on my reading, a significant amount of research and work has been done over the last few years on the impact of the fracking industry. Even since we put in our submission in the past couple of months, significant work about various issues relating to the fracking process has been published in well-regarded journals, with some particularly relating to the contamination of water supplies with endocrine disrupters. More specifically, there has been some interesting work on well integrity not only when the mines are functioning, but also into the future. Once the wells are decommissioned, they continue to exist within the community. A particular concern for us, which we were made aware of more recently and since we put in our submission, is the fact that pumping a lot of fluid into the earth increases seismic activity, which can have an impact on well integrity. We can build the best wells possible, but we need to make sure that they withstand potential seismic activity. Increasingly, research evidence published over the last few months in the journal *Science*, which is a prestigious and well-read journal, shows that there is limited but growing data about the causal link between injecting fluid into the ground through fracking and seismic activity in earthquakes. To begin with they are very small, but an increase in seismic activity can occur when more wells are in a particular area. To begin with it is only within a kilometre of a well, but there is an increase in seismic activity when there are more wells in the vicinity and when more fluid is pumped into the wells. We do not know whether the seismic activity will stop once the fracking finishes. There is significant concern from that perspective. Did that answer your question?

Hon SAMANTHA ROWE: Yes, thank you.

[11.20 am]

Hon BRIAN ELLIS: I refer to your comments about occupational optional health and safety. I am having trouble. Perhaps you can explain to me or give me evidence as to why there is a difference between fracking and the many other forms of mining that we already have? Why is there a difference in the health and safety of workers in your view? That is, for the workers involved.

Dr Croager: The right regulations must be put in place for the workers but the workers are just one aspect of this industry. From a public health perspective, workers are a concern to us and occupational exposures to workers are a concern for us. Obviously, if the right regulations are put in place to protect the workers, if there is a rigorous framework put in place—I am sure these things already exist in Australia—then workers will be protected. From our perspective, the other concern about fracking more generally is the impact that it may potentially have on water supply and the environment as well as the direct and indirect impacts on health. This is outlined in the table in our submission.

Hon BRIAN ELLIS: Which is different to what you are saying about health and safety for the workers?

Dr Croager: Yes, it is different.

Hon BRIAN ELLIS: Really, the standards that we now have for our mining should cover the work in fracking.

Dr Croager: They should. I cannot really speak to that because I am not an expert in that area. I am sure there will be people who have more expertise who can speak on that. The industry is quite a new industry and the Cancer Council of Australia—I actually work for the Cancer Council in my day job—has recently put together a position statement specifically on fracking and the risk of cancer. We do not yet have enough evidence about this industry to say whether there is an impact from cancer risk on health. Some research has shown that there is the risk of potential exposure to silica for workers specifically in the fracking industry. I came across a recent report that actually suggests that more rigorous steps be put in place across the whole process that uses silica in the fracking industry to reduce the risk to workers. There are regulatory frameworks that can be put in

place to protect workers but the fracking industry, because it is not an old industry, has the potential to impact health—based on what we know from other industries. If those regulatory frameworks are not put in place effectively, there will be an impact to the health of workers.

Hon BRIAN ELLIS: I would have thought that silica would be involved in other mining practices. You say that the implication of fracking on health and safety is not well understood; not well understood by whom? You are saying that the people who are putting in the regulations for health and safety for our mining industry—WA now has a pretty good record in mining safety—do not understand.

Dr Croager: No, I am not saying that they do not understand. I am saying that evidence is still emerging to show what the health impacts are. The regulatory frameworks need to be put in place but obviously we also need to keep an eye on the evidence in other industries and also in the industry in other parts of the world to make sure that our regulations are up to speed with what is happening in the fracking industry specifically.

Hon BRIAN ELLIS: You mentioned coal seam a number of times but you have not mentioned shale gas fracking. What are your concerns about shale gas?

Dr Croager: What we have been speaking about is unconventional gas, not coal seam gas specifically. We were involved in the coal seam gas harmonising framework at the national level, but the submission we put in specifically talks about the two types of fracking that are happening in WA, which is not necessarily coal seam gas, it is shale or the other type.

Hon BRIAN ELLIS: I am just not sure what your concerns are about bushfires and fracking. I would have thought that the risk for bushfires is right across the board from farmers to miners to anyone. Why is fracking so much more a concern?

Dr Croager: It is probably not more of a concern—it is a concern. It is the potentiality of the fugitive volatile chemicals that might be produced during the fracking process. Directly, it is the fugitive emissions or potential emissions coming off the wells. The other issue is the impact of the methane gas being produced by the wells on climate change and bushfire risk.

Hon PAUL BROWN: I have a few questions, but I will just follow up on that one. Would you not suggest that we have been encouraged to move from a coal-based energy system by the environmental sector to an LNG-based energy sector because of the low CO_2 footprint that LNG has compared with coal? I know the CO_2 footprint of LNG is a lot greater than renewable energy, but would you not suggest that moving to an LNG-based sector and away from a coal sector is far more advantageous to the environment?

Dr Croager: Based on my understanding and the work I have been doing on the submission—even though we obviously spend a lot of time comparing gas with coal and coal is obviously a lot dirtier fuel than gas—if we compare gas to renewable energy, renewable energy is a lot cleaner. I read a recent report about methane production, which is the predominant gas produced during the fracking process. Methane has a global warming potential that is 25 times the carbon dioxide emissions from coal over 100 years. It has the potential to significantly contribute to greenhouse gas emissions. It also does not take into account—I do apologise. One of the statements I have here says that fracking produces 40 per cent of the greenhouse gas emissions of coal, but this does not take into account fugitive emissions that are produced. I am not aware of any figures for Australia about the amount of fugitive gas emissions produced, but my understanding from other sources is that it is around 0.1 per cent to nine per cent. We just need to make sure. I have forgotten what the question was.

Hon PAUL BROWN: My question was that you have raised the spectre of environmental and climate change concerns of fracking, but in actual fact all the evidence presented to us anecdotally by the community is that liquid natural gas, whether it is conventional gas or unconventional gas, has a lot smaller footprint. In fact, you can actually cater to peak demand or off-peak demand in a much more managed way with liquid natural gas than with coal, which has to be continually held at

a baseline level. You can turn gas on and off as required. You raised the spectre of climate change and the environment but in actual fact the use of liquid natural gas creates a far better outcome for the environment than having coal continually running at a base level.

Dr Croager: It is really outside my expertise to comment on the specifics of that.

Hon PAUL BROWN: You have put that in your submission. If you are going to put it in your submission, you should be ready to face some questions about it.

The other question I want to ask you, Dr Croager, refers to water, which you have spoken about. The Department of Water and the Water Corporation have said in their submissions and publicly as well that they encourage the industry to operate outside a buffer of about 2 kilometres from the public drinking water supply system and aquifers. How does that sit with you? Does that allay your fears? Would that allow the industry to move forward in relation to the contamination of drinking water supplies?

Dr Croager: It allays our fears to some extent, if they are protecting the existing water supplies and as long as we are also protecting the supplies that we might be using into the future from contamination.

[11.30 am]

Hon PAUL BROWN: The water that you are talking about being contaminated—is that drinking water? Or are you talking about sub-aquifer contamination which may not be fresh water; it could be saline water which will never be used for public drinking water. In a lot of cases the licences to take water for fracking that the industry might actually apply for will not take water out of the public drinking water system. It will be taken from below-ground aquifers which may in fact be saline.

Dr Croager: To go back to your original question, if there is a guarantee that the water supplies can be protected then that allays our fears.

Hon PAUL BROWN: The two-kilometre buffer zone would allay your fears?

Dr Croager: I do not know the specifics of the science of the two-kilometre buffer zone. There is some evidence from a recent publication that there has been contamination of wells, aquifers and water supplies within a kilometre of wells but I do not know the specifics of that two-kilometre buffer zone so I would need to rely on the experts.

Hon PAUL BROWN: Was that contamination through well integrity leakage or through surface contamination?

Dr Croager: Groundwater and surface water was tested and there was evidence of endocrine disrupters in those water supplies.

Hon PAUL BROWN: Was that in Australia or overseas?

Dr Croager: That was in the United States.

Hon PAUL BROWN: But there is no evidence at the moment that fracking in Australia has led to water contamination.

Dr Croager: There is from New South Wales, where fracking has led to contamination of the water supply.

Hon PAUL BROWN: Are you talking about New South Wales —

Dr Croager: Yes and that was a pond lining —

Hon PAUL BROWN: That was coal seam gas.

Dr Croager: Yes, it was coal seam gas.

Hon PAUL BROWN: So it had nothing to do with fracking.

Dr Croager: Coal seam gas is a type of fracking.

Hon PAUL BROWN: Coal seam gas is not fracking.

Dr Croager: Yes, I am sorry; you are correct.

Hon PAUL BROWN: That was a CSG containment pond that leaked long after the activity in that area was complete. It has since been remedied. So, yeah; some of the stuff that has been let out lately about that particular incident has been a little bit disingenuous. Some comment on my behalf.

The CHAIRMAN: Did you want to address any of the points raised, Dr Croager?

Dr Croager: No I do not—if you are happy with my response.

Hon PAUL BROWN: That is fine; I will leave it up to you.

The CHAIRMAN: We have already touched on this a number of times but I have a simple question—if you are able to assist us with this. I note that the body of data on a lot of these things is incomplete at this time. Are you aware, or is the association aware, of any effects on public health which have been shown to be caused by fracking specifically, rather than say mining or suchlike activities in general?

Dr Croager: I am sorry?

The CHAIRMAN: I am just wondering if you are aware of any adverse effects on public health that are specifically attributable to fracking activities rather than oil exploration and production or mining in general? My reason for asking is because there are anecdotal claims that people, particularly in America, have been adversely affected by fracking operations. The counterpoint to that is that the cause of the health problems, or whatever they may have been, were not actually caused by the fracking activity but coincided with it. There was some other explanation. We are wondering if your association can help us to clarify this matter.

Dr Croager: The evidence that we produced in the submission about the primary and direct effects do, to some extent, explain some of the health effects from fracking that have been seen in communities in the United States.

The CHAIRMAN: Is that table 1 on page 5?

Dr Croager: Yes, they are in table 1. Regarding some of the physical effects that have been seen in people living close to wells from the volatile hydrocarbons and so on, there have been some reports on emissions from unconventional natural gas resources and their effect on health. I am sorry but I am getting a bit flustered because of the questioning.

The CHAIRMAN: Please, take your time. I hope my question was not too hard. I put in a lot of explanatory material. Let me put it this way: one of the tasks that the inquiry has is to try and compare and evaluate competing claims. This is where a professional body like yours may be able to assist. We are looking for information where you have been able to identify instances of actual adverse outcomes to public health that can be attributed to fracking activity.

Hon SAMANTHA ROWE: Is that here in WA, in the US or in general?

The CHAIRMAN: Just evidence from anywhere, but certainly, I would particularly like to know about any in WA. Obviously we want to avoid that.

Hon SAMANTHA ROWE: But it could be the US.

The CHAIRMAN: It could be anywhere.

Dr Croager: There are certainly a lot of reports that have come out in the United States that we have referenced in our submission and that is where we have taken that evidence for the health effects from for our submission.

Hon SAMANTHA ROWE: Just leading on from that, was it actually concluded with evidence that that is what caused the health problems? That is was fracking? Were they able to make that determination?

Dr Croager: I would have to go back and look at those original references to see the specific readings and the terminology but the fact is that these health impacts were occurring in areas where there was fracking. I would have to go back and just check that.

The CHAIRMAN: Sure, we appreciate that. Again, going back to the substantive document, which is your submission, one of the things that I certainly take from it is that you are highlighting risks to public health that may occur. Then, in your recommendations you identify things that should happen to eliminate, reduce or mitigate those potentialities.

Dr Croager: That is correct.

The CHAIRMAN: I just wanted a clear understanding of that.

Hon PAUL BROWN: Doctor, have you been able to have a look at the newly formed Department of Mines and Petroleum regulations?

Dr Croager: I have seen the short version of that document. I have not seen the longer version.

Hon PAUL BROWN: You have not had an opportunity to look at the wider scope yet?

Dr Croager: No, I have not.

Hon PAUL BROWN: I was just wondering if you had availed yourself of it, that is all.

Dr Croager: Oh yes, I have.

The CHAIRMAN: Dr Croager and Ms Godsell, thank you very much for your submission and for attending today. You have been a great assistance to us in our inquiry. I note that there was a matter of supplementary information which we look forward to receiving. Apart from that I think we are done for now. Thank you once again and we wish you a good morning.

Dr Croager: Thank you.

Ms Godsell: Thank you.

Hearing concluded at 11.39 am