

**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 DONGARA
MONDAY, 27 OCTOBER 2014**

SESSION THREE

Members

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

Hearing commenced at 1.05 pm**Mr BRUCE CLEMENT****Managing Director, AWE Ltd, sworn and examined:****Mr MARK FABIAN****Subsurface Manager, Onshore Western Australia, AWE Ltd, sworn and examined:**

The CHAIRMAN: On behalf of the committee I would like to welcome our witnesses to this hearing. Before we begin, I must ask that you take either the oath or affirmation.

[Witnesses took the oath or affirmation.]

The CHAIRMAN: I notice that Mr David Guise is not joining us today?

Mr Clement: No; Mr Guise unfortunately is not available.

The CHAIRMAN: You will have signed a document entitled “Information for witnesses”. Have you both 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, please quote the full title of any document you may 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 a contempt and may mean that the material published or disclosed is not subject to parliamentary privilege.

Mr Clement, do you want to make an opening statement to the committee?

Mr Clement: Yes, Mr Chairman.

The CHAIRMAN: Please do so.

Mr Clement: I would like to make an opening statement and I have provided copies of the statement to you. I will read from the statement. Firstly, I would like to thank the committee members for extending the invitation to AWE to address you today. AWE welcomes the opportunity to continue its contribution to the inquiry into hydraulic fracturing and to progress the constructive dialogue on both the merits and perceived risks of hydraulic fracturing in Western Australia, particularly given increased public interest in the matter. No matter what the committee’s eventual recommendations are, the mere fact that we are sitting here today in Dongara talking openly about hydraulic fracture stimulation in a public setting helps to contribute to both a greater understanding of the process and engagement with the community. Rather than repeating general hydraulic fracturing information, today I will provide the committee with relevant information about AWE’s operations in the North Perth basin. I should point out that our company has been at the forefront of onshore oil and gas in Western Australia and we have demonstrated on a number of occasions that hydraulic fracture stimulation of wells can be achieved safely.

I will address four topics in this opening presentation: a brief overview of AWE and its midwest operations; AWE’s experience of the regulatory environment in Western Australia; the Woodada

Deep well case study that was the subject of our written submission to this committee; and a snapshot of the Senecio-3 and Drover-1 wells, our two most recent wells drilled in the Perth Basin. I think perhaps for the efficient use of time I will not go through the AWE overview in detail, but there are a couple of points I will bring to your attention there.

[1.10 pm]

The CHAIRMAN: That would be appreciated.

Mr Clement: There have been more than 200 wells drilled in the Perth Basin. AWE and its predecessor companies have successfully drilled more than 80 of those wells. This point is worth highlighting as it demonstrates our capability to drill and produce safely and to protect the surrounding environment. I would also like to say that AWE has been and will continue to be an active participant in the midwest community and we plan to be here for the long run. Part of this contribution to the community is the \$5 million AWE currently spends annually in the midwest economy and community through wages, supply agreements with local contractors and community partnerships. If AWE increases its operations in the midwest, investment will also increase. Other oil and gas companies, such as Origin and Roc Oil, and APA, also make significant contributions to the midwest.

In terms of regulatory standards, our company believes that Western Australia has a robust regulatory framework in place and it ensures both drilling and hydraulic fracturing operations meet the highest safety and environmental standards. Our company has significant experience in upstream oil and gas operations. We have operations in Western Australia, Indonesia, New Zealand, China and the United States, which exposes us to regulatory framework in each of these jurisdictions. Our experience in Western Australia is that the regulatory processes and procedures are clear, robust and transparent. While at times, like all operators, we would prefer some faster decision-making, we understand and support that the Department of Mines and Petroleum, the EPA, the Department of Water and other regulatory bodies must undertake a rigorous assessment of the proposals placed before them.

I will now move onto AWE's formal written submission to the inquiry. In our submission we used our experiences at the Woodada Deep well in 2012 as a case study because, unlike many submissions, we were able to use robust data obtained from drilling and fracture stimulating a well in Western Australia. The Woodada Deep case study highlights that as a company, AWE is not just talking about what may or may not happen during a hydraulic fracture operation, but what did happen and the measurements obtained from monitoring that operation. We have hard data that proves our operations were safe and environmentally sound. Baseline studies of water and air quality, when measured against post-hydraulic fracturing results, prove the safety of our operations. In addition, AWE also engaged a specialist company to assess the impact and extent of the hydraulic fracture stimulation process using microseismicity. AWE was not compelled to collect this data; we chose to collect it so that we could improve our knowledge of the extent and direction of fracture propagation and so that we could be absolutely confident that the induced fractures were not extending beyond the target zone. All these results were collected and independently analysed, which is an essential element of our commitment to openness, accountability and transparency. You have the environmental monitoring results from our submission, but I think it is important to highlight that the consultants we contracted concluded that the comparison of the data against baseline groundwater monitoring indicated that the hydraulic fracture stimulation operations had no discernible influence on groundwater conditions in the vicinity of the Woodada Deep site. In addition, the microseismicity results confirmed that no out-of-zone fracturing occurred.

In the coming year, AWE will be focused on progressing two key projects in the north Perth Basin: The Senecio-Waitsia field development, and possibly the hydraulic fracture stimulation of the Drover-1 well. I draw your attention to the map that we have provided on the two locations of such. The Senecio field is shown in the northern section of the map, just to the east of Dongara.

The Waitsia field I referred to is actually a gas accumulation, deeper, but in a similar location to the Senecio field. We call it the Senecio–Waitsia field, although it is two gas formations, one at about just under 3 000 metres and one about 400 or 500 metres deeper. We have drilled through the first —

The CHAIRMAN: They are quite different stratas?

Mr Clement: They are quite different horizons, quite different stratas, and they are not in communication with each other.

The CHAIRMAN: Just looking at your map, that is about 10 to 15 kays east of Dongara?

Mr Clement: That is correct. In fact there is a scale at the bottom of that map that you can see from.

The CHAIRMAN: Yes. What is the red area on the map midway between Senecio and Dongara town site?

Mr Clement: The red markings on the map, or the red fields, that is the Dongara gas field, which was discovered in the 1960s and has been producing since 1971 and is currently producing late in its life, but AWE is still operating that field and producing gas.

The CHAIRMAN: How many wells would there be in that area?

Mr Clement: I might defer to Mark.

Mr Fabian: Thirty-five wells were drilled.

The CHAIRMAN: Thirty-five wells, and they have been there for decades?

Mr Fabian: Yes, since the 1960s.

The CHAIRMAN: That is interesting, as the community obviously has experience then of —

Mr Clement: The industry has been in this area, particularly the north Perth basin and the Woodada area to the south, for a number of years; in fact, decades. Obviously for 50 years the industry has been operating here, both with gas developments and with oil developments, onshore and offshore.

The CHAIRMAN: Sorry to interrupt your opening remarks.

Mr Clement: That is okay.

The CHAIRMAN: I think we will come back to that.

Mr Clement: We can go back to my opening remarks, and I will close those quickly.

Hon BRIAN ELLIS: While you are on it—I do not want to interrupt —

The CHAIRMAN: Just a further interruption!

Hon BRIAN ELLIS: You say that there are 35 wells. How many of those were fracked?

Mr Fabian: There have been 12 wells fracked in addition to the three we have recently done, and 12 wells were done by predecessor companies. I could not tell you exactly how many were on Dongara; possibly half of them were on the Dongara field.

Mr Clement: In the basin.

Hon BRIAN ELLIS: Okay; I just wanted to get some perspective of how many were and how many were conventional.

The CHAIRMAN: So half of them have already been subjected to hydraulic fracture simulation?

Mr Fabian: No. There were 12 wells that were hydraulically fracked in the past, and I would say six of them were possibly done on Dongara. I do not have that exact statistic, but I can get it.

The CHAIRMAN: Then it is even more relevant to come back to that in a little bit.

Mr Clement: Yes, we can come back and talk to that, but that fracking was undertaken a significant period of time ago, not recent years.

The CHAIRMAN: We had better find out what happened. We will come back to that.

Mr Clement: Yes, that is okay. Just on our work program and coming back and talking about the fields, the Waitsia gas field, which is underlying the Senecio field, was discovered in September this year, and it represents an exciting new play in the basin for AWE and for Western Australia at large, with large potential upside in terms of —

The CHAIRMAN: This is interesting. The Waitsia, is that the deeper one?

Mr Clement: The deeper sand, yes, that is correct, and I could talk more about that as we proceed. The Senecio and Waitsia fields provide an early conventional gas development and production opportunity with combined contingent resources of approximately 360 BCF of gas; and that is what we call 2C contingent resources, which is the best estimate of the resources at the moment. But obviously with one well in there, we have a range of resources from something like 70 BCF to over a TCF or 1 000 BCF of gas. So, there is a significant range, and a lot more work needed to be done to quantify that more accurately. But to put that figure in perspective, the 360 BCF is approximately the equivalent of one year of Western Australian domestic gas consumption. It is also the largest onshore conventional gas discovery since the Dongara gas field was discovered in the 1960s. Coincidentally, we are still producing gas from Dongara as we speak, although albeit at small rates and towards the end of its life.

The CHAIRMAN: Senecio—if I have pronounced it correctly—and Waitsia, are they both conventional fields?

Mr Clement: Senecio is the shallower, and we drilled that, and that is what we would call a tight gas field, not a shale gas field; the tight gas meaning that it is a conventional reservoir but has low porosity, low permeability and low-flow characteristics. The Waitsia field at this stage, we only have initial log data and some sidewall cores from that field, but the indications are that it is a moderate to good quality reservoir, and we do not really know how good a quality it is until we flow test it. But at this stage we are of the view that it is likely to be a conventional development if we go ahead and develop it.

The CHAIRMAN: Is that unusual, to have a conventional deposit below an unconventional?

Mr Clement: No, it is not unusual, and in fact that happens in other parts of the world. In fact, when we talk about unconventional gas, it is not actually gas that is any different from other gas; it just comes from—I am sure you are familiar with it—an unconventional formation. In fact, conventional reservoirs lie below shale reservoirs, for instance, and that is regularly the trapping mechanism for conventional reservoir gas and oil to lie below the impermeable shales, which in themselves could become unconventional targets at later dates.

[1.20 pm]

The CHAIRMAN: Thanks for clarifying that. Please go on.

Mr Clement: So the Senecio-3 well has been cased—it was a Senecio-3 well that discovered Waitsia—and suspended in preparation for conventional flow testing later this year or early next year. And, as I said, due to the moderate to good reservoir quality observed during the drilling of the well, our current view is that the Waitsia discovery is likely to be a conventional gas field. However, flow testing and further appraisal wells will be required to substantiate that view. As I said, if ultimately developed, it could reduce Western Australia's reliance on offshore gas and/or coal and provide up to 10 per cent of the domestic gas supply and could provide Western Australian industry and consumers with a new source of competitively priced clean fuel. Contained within the Senecio-Waitsia acreage is a significant unconventional gas play as well,

which has the potential to be even larger than the conventional play and could also make a substantial contribution to the future energy needs of Western Australia.

So, if we are moving down to the south now to the Drover well, which you can see on the map, in June this year, AWE commenced drilling the Drover-1 exploration well to a total depth of 2 400 metres. The well was aimed at gathering a comprehensive understanding of the subsurface geology, and it did target unconventional as well as conventional targets. We have successfully intersected all the target formations and obtained a series of core samples and log data from the well. The well was drilled without any adverse health, safety or environmental incidents. Gas readings from the formation were observed while drilling, although the significance of these readings is currently being evaluated. Once the analysis of those readings or that data and the core samples is complete, we will be able to better inform the local community about our intentions for the next stage of operations, which may potentially involve the use of hydraulic fracture stimulation.

While AWE has already received approval to hydraulically fracture the Drover-1 well, we have made a commitment to continue to openly engage with the local community about those operations should we decide to proceed with them. We have been very open about the process and have been willing to engage from day one. Community consultation and engagement in preparation for the Drover-1 well, as with all our midwest operations, has been an extensive, two-way process with the local communities. We do seek feedback and we respond promptly. We have used a number of avenues for informing the community, including mailing letters to residents, meeting with local decision-makers and the relevant shires, and holding community information sessions, which were advertised in advance in local papers, as were summaries of the information sessions afterwards. In addition, a local community reference group has now been formed with the aid of an independent facilitator to lead discussion. This will provide AWE and local residents with an additional conduit for engagement with each other.

The CHAIRMAN: Are you able to tell us who the independent facilitator is?

Mr Clement: I do not have his name on me. Can I refer to someone? It is Craig Salt.

The CHAIRMAN: Craig Salt?

Mr Clement: Yes. My apologies for not having that name at the top of my head.

The CHAIRMAN: No, that is all right.

Mr Clement: I should point out that a number of state regulators have scrutinised our proposal to drill and conduct a trial hydraulic fracture at Drover-1. The proposal was reviewed in various forms by the Department of Mines and Petroleum, the Environmental Protection Authority, the Department of Water, the Department of Environment Regulation and the Appeals Convenor, and the submission was ultimately approved. I do have some further information on Drover-1 well design and aquifer protection, as well as gas volumetrics for the Senecio-Waitsia field. However, I anticipated that they might be the focus of some of your questions today, so in the interests of time I will perhaps conclude my opening statements, and then, if they are not asked and we do have time, I can provide that information at the end of this submission.

Before I take your questions, though, I would like to thank the committee for implementing this inquiry. As I said at the beginning, the fact that we are here today discussing hydraulic fracture stimulation in a public setting has a positive role to play in contributing to both a greater understanding of the process and increasing engagement with the community. As I mentioned earlier, AWE and its predecessors have successfully drilled more than 80 wells in the midwest of Western Australia and has safely hydraulically fracture stimulated three of those wells. We are absolutely confident in the capabilities of our company to continue to do that safely, and to build on the \$5 million a year we already spend in the local community, as well as adding substantially to the

gas we supply every day to Western Australian households and businesses. I will finish there. Thank you.

The CHAIRMAN: Thank you very much for that. Mr Clement, you have seen a lot of this issue, I have no doubt, in various places. Why is it that in a jurisdiction like Western Australia, where we have mining for all sorts of minerals on a massive scale, and we have oil operations onshore and largely offshore, and then when it comes to a process that involves hydraulic stimulation for unconventional gas, we have a major issue on our hands? What is it about fracking, as people call it, that is so different?

Mr Clement: I should just take a step back. In terms of hydraulic fracture stimulation of wells in Western Australia, I think it is a knowledge issue and a communication issue that I think as a whole is improving greatly. This inquiry that you are conducting I think will help enormously in this process, because at both sides you generally have different views on how safe the operation is and the outcomes of operation. We as an industry participant are very confident about the safe operation of hydraulic fracture stimulation, but there are always people who will have a different view, and I think that is being expressed. What we need to do, I think, as participants in that—and that is you and ourselves in the industry—is engage with the communities and ensure that there is an understanding, a thorough understanding, and a science and fact-based understanding of the issues involved; and I suspect and I know that has not been the case in total to date.

The CHAIRMAN: Let us go back, if we may, to the Dongara field, which is just out of Dongara township, only a few kilometres, where we have around, I think you said, 35 wells in that field, a number of which have been fracture stimulated in the past.

Mr Fabian: That is correct.

The CHAIRMAN: In terms of our current inquiry, would it be relevant to be asking questions about the experience in the Dongara field?

Mr Fabian: We can tell you about the ones that we have hydraulically stimulated, the last three.

The CHAIRMAN: Sure.

Mr Clement: I should add they are not in the Dongara field. The Dongara field fracture stimulation was conducted decades ago, almost. So it is pre my experience in the Perth basin, which has been here for nearly 15 years.

The CHAIRMAN: What about you, Mr Fabian, are you able to comment on the history of the Dongara field?

Mr Fabian: I can comment. There were some moderate size to small scale hydraulic fracture stimulations carried out on various formations, possibly up to six wells. I have not seen any records of any issues during those stimulations.

The CHAIRMAN: That is my obvious question.

Mr Fabian: Yes, that is right.

The CHAIRMAN: We have a huge brouhaha going on now. Was there that then?

Mr Fabian: No.

The CHAIRMAN: Why not?

Mr Fabian: There are no recorded issues that I am aware of on those stimulation treatments.

The CHAIRMAN: Did we have any water pollution or anything?

Mr Fabian: No, not that I am aware of.

Hon PAUL BROWN: No contamination at all from anything?

Mr Fabian: Some of the older mud sumps that are associated with the drilling process, we have been going through a review of those and splitting them into various demographic areas and investigated specific well sites and mud sumps to ensure that they do not have any environmental threats, and we are going through with the authority that is relevant to the contaminated sites on that, and that investigation is underway.

Hon PAUL BROWN: How many of those 35 wells in the Dongara field would be considered to be decommissioned or abandoned?

Mr Fabian: I have not got that number on top of my head, sorry.

Hon PAUL BROWN: But they are not all active at the moment?

Mr Fabian: No, not all of them. Some of them were abandoned in the past by the previous operator.

The CHAIRMAN: You talk about site contamination. What is the nature of the contamination?

Mr Fabian: It was the drilling muds that were used at the time, mainly bentonite and materials like that, that was used in the drilling process.

Hon BRIAN ELLIS: So, above-ground contamination?

Mr Clement: Yes.

Mr Fabian: And they were put in pits above ground, yes.

[1.30 pm]

Mr Clement: It relates to the practice that was in the industry, you know, 30, 40 years ago, which is certainly not the practice today. As the custodian of those licences, that is our responsibility, and we take that on fully, to ensure that we decommission those sites and clean up any issues in relation to past practices there, and that is what we are doing. So we have an active program in place to address potential contamination of those sites. We identified one site, and so we are going through a process now and we are working with the DMP to make sure we are fulfilling our obligations.

Hon PAUL BROWN: And that's on Mr Copeland's property?

Mr Clement: No, that is not on Mr Copeland's property; no.

Hon PAUL BROWN: Where is that site, then?

Mr Clement: I am sorry?

Hon PAUL BROWN: The site that you are talking about now, whereabouts is that?

Mr Clement: I think it is —

Mr Fabian: There are a number of Dongara wells.

Mr Clement: Yes. It is around the Dongara field, and I am not sure which property they are on, but there is one near the Dongara field, which was our original one we identified.

Hon PAUL BROWN: Is Mr Copeland's one of the ones in the Dongara field?

Mr Clement: No. That was a different well, the Yardarino well, and that was drilled quite a long while ago; in fact drilled well before Mr Copeland owned the property.

Hon PAUL BROWN: Yes. That was one of your, shall we say, subsidiary companies?

Mr Clement: No, it was not.

Hon PAUL BROWN: Well, you took over the licence.

Mr Clement: Yes. We have taken over the licence. In fact, Yardarino was drilled by probably Wapet in the Yardarino field very early on, and we have subsequently inherited that as we have taken on responsibility for those licences and permits.

The CHAIRMAN: Should people who are concerned about the effects of contamination or groundwater pollution or surface-water pollution be using the Dongara field historical experience as evidence to justify their concerns about hydraulic fracturing?

Mr Clement: No.

The CHAIRMAN: Why not?

Mr Clement: In fact, the practices that we use today are significantly enhanced on those that were in practice at that time. In fact, the drilling fluids have changed. But, more importantly, the site, when we are talking about potential surface contamination, is now very well managed and we have mud pits and pits where we recycle the fluids, but importantly our contained drilling mud sumps and pits. Anything that is there now goes into a pit. They are double-lined pits, and that is with polypropylene, so they are properly lined, and no fluids can get into the soil below, and we actually monitor that pre and post the drilling program to ensure nothing has escaped those pits and got into the soil. In addition to that, they are fenced off. The sites are designed so that there is no potential rainwater flowing into them and overflowing from them. So anything we use on site, that is diesel and other chemicals, are banded and protected from going into the open environment, and we have now very safely lined pits and very safe operations in terms of potential contamination.

Hon PAUL BROWN: Are those liners all HDPE?

Mr Clement: Yes.

The CHAIRMAN: Let us move down to the Drover-1 site, down east of Green Head. Did you find any natural faults at the Drover-1 site when you did the seismic test?

Mr Clement: We have acquired 3D seismic over the area, and in fact in terms of —

Mr Fabian: Drover we have not.

Mr Clement: It is 2D?

Mr Fabian: It is 2D.

Mr Clement: Sorry, my apologies. We have 2D seismic over the area, and in terms of faults, we have identified faults in the area, but in the location of the well, we have located that well to be away from any significant faults. So we actually were aiming to be away from faults. We do not want to be near faults.

The CHAIRMAN: What is the purpose—this is for the record—of trying to locate your well away from faults?

Mr Clement: Firstly, if we are aiming for a body of hydrocarbons, it is better to be away from that fault in an unconventional target, and we picked the most optimal location for optimising an outcome. The second reason —

The CHAIRMAN: Why is that? Is that because you do not want —

Mr Clement: Just volumetrics and what we perceive is going to be the potential quality of rock and hydrocarbon content. But the second one, and probably more importantly, is that we do recognise that we are going to frack there and we do not want to be fracking—you know, our fracking propagations are of the order of a couple of hundred metres—propagating into faults.

The CHAIRMAN: Why not?

Mr Clement: One, it is less effective in terms of if it goes to a fault, it will stop; it will not propagate through the fault, so it is less effective. Two, it is going to then open our well up to potentially seeing fluids from that fault but not the other way, so to speak, coming to us.

Hon PAUL BROWN: In other words, you mean you will lose gas into the fault.

Mr Clement: No, we will see something coming to us.

Hon PAUL BROWN: Coming the other way into yours.

Mr Clement: Yes. We certainly place our wells a significant distance from any faults when we are hydraulically fracturing.

The CHAIRMAN: This is an important point, because we have heard claims—in fact, some people are going to strenuous lengths to try and prove this—that if an induced or hydraulic fracture intersects with an existing natural fracture, that can cause the leakage of contaminants from an otherwise quarantined impervious layer of shale, for example, into other layers such as watertables, and that is why I am pursuing this matter. Is there any advice you can give us about that?

Mr Clement: I cannot give you specific advice on that. Generally, faults are not all the same, so there are case-by-case considerations when you are going to drill a well and considering fracking a well. But I can say that we will place our wells away from faults so we are not fracking under them and giving ourselves significant spacing between where we see fracture propagation and the location of potential faults.

The CHAIRMAN: Having done the seismic work, that is easy to do?

Mr Clement: Yes. It is relatively easy to pick the significant faults.

The CHAIRMAN: And that is partly why you do the seismic survey?

Mr Clement: Yes. We do the seismic to identify structures and also to identify rock bodies that we want to target, yes.

The CHAIRMAN: I just want to clarify an exchange you had with Mr Brown just a moment ago. If you did have an induced fracture line intersect with a natural fault, I think you indicated that the concern would be that there would be external fluids invading your well space, whereas the people who are concerned about the effects of fracking believe that it would cause fracking fluid or other substances to actually go out from your well externally. What is the likelihood it would happen?

Mr Fabian: In the fracking process, when we do a stimulation, we are pumping down, creating this fracture that propagates. Immediately following that, we actually flow back the well, so the pressure that we put down there we take back. We produce as much of the frack fluid as we can to surface; it is put in those dual-lined retention ponds and we have got a lower pressure around that pond. The low pressure would dictate that fluids are going to come towards you.

The CHAIRMAN: That is a key point in terms of what we are looking at, presumably because the other external pressures —

Mr Fabian: Would be higher.

The CHAIRMAN: — are higher because of the depths and so on.

Mr Fabian: Yes. When you abandon a shale field, you abandon it once you have depleted the pressure. Things are going to flow towards that.

Hon PAUL BROWN: Over time through that pressure when you are fracking, obviously you are putting under pressure; you are putting your particulates in the frack fluid to keep the fractures open. But over time, with the lack of pressure and also with the surface pressure, eventually those fracks close up as well.

[1.40 pm]

Mr Fabian: That is correct. They crush the proppants in cases—the sand that we put down there or that embeds into the fracture wall—so the fractures become less and less efficient.

Hon BRIAN ELLIS: I have a couple of questions going to your submission actually. I suppose I will go to the obvious one that everyone seems to be concerned about—the chemicals you use in the fracking. I note that you have some concerns about total disclosure. Why? When we went to America, some companies are not that worried about disclosure. Everyone knows the chemicals that

are used. One company said to us, “We don’t care. Most of the other companies know what we’re using anyway”, so they are happy for the public to know.

Mr Clement: The concern is not actually the disclosure concern; the concern that we have is getting access to the best and most benign chemicals. As this industry has evolved, there has been proprietary development of chemicals, and in some jurisdictions, that proprietary treatment is allowed and not disclosable. Our concern is that we want to get the best and most benign fluids and if we are potentially not going to get access to them if we cannot disclose them, or if we have to disclose them and cannot disclose them—if you understand that. We are very happy as a company to be disclosing and we want to have full disclosure; it is really the concern that we do not want to inhibit getting the best products into Australia to be able to use in hydraulic fracture stimulation and into Western Australia, so that the most benign and best developed, which is where the industry is going, is not available to us because those companies choose not to allow us to fully disclose the information.

Hon BRIAN ELLIS: I see.

Mr Clement: As a company, we are very much in support of full disclosure.

Hon BRIAN ELLIS: Those companies are worried about their patents.

Mr Clement: Yes. The reality is that in a year or two’s time, that will get overtaken as things develop. I am of the view that the industry is moving to full disclosure, and that is where we want to go as a company. I just want to make sure we get the best outcomes for what we are doing in Western Australia.

Hon PAUL BROWN: When we were in the United States, we met with a range of industry stakeholders. Just expanding on what Mr Ellis just said, the three big players worldwide are Halliburton, Schlumberger and Baker. Baker, as Mr Ellis has said, have moved completely towards voluntary full disclosure of everything. Under the premise that if there is full disclosure, they may not allow the chemicals to come in to advance our industry here, how does Baker then stay as one of the top three in the world? Obviously, they have got a very technological advancement compared with other players in the industry. How do they stay relevant on a global scale if they have moved to complete disclosure?

Mr Clement: I cannot speak for Baker and their business model and what they are doing, but I can reiterate that our relationship with contractors providing those services to us is that they must do it on a full disclosure basis. Baker, obviously in that circumstance, is a candidate for us to be using as a service provider there, and that is the requirement now in drilling wells and fracking wells in Western Australia, and we certainly are supportive of abiding by it. We probably could have phrased what we wrote better in the submission. It was not a question of saying, “We don’t want to disclose”; it was more we want to get access to the whole industry and all the products that are available in the industry and the best products. I cannot really comment on how Baker’s business model works.

Hon PAUL BROWN: No. I was more interested in your opinion, not Baker’s opinion.

Mr Clement: My opinion is that Baker would be leading the way here if that was the case.

Mr Fabian: When we tender for those services, we require full disclosure of their proposed chemicals, and that is a part of the tender process, so if they cannot fulfil that, they do not get the —

Hon PAUL BROWN: Are Baker active in Australia?

Mr Fabian: Yes, they are.

Mr Clement: They are.

Mr Fabian: But they are bringing some more equipment over at the moment.

Mr Clement: I think Halliburton and Schlumberger have been ahead of the game, so to speak, and Baker have come in here —

Hon PAUL BROWN: It is a very small industry at the moment. On a global scale, our industry is very small, even if you take into account Moomba and Santos. How many drill rigs are available? There are only six or a dozen drill rigs available in Australia at the moment, I think.

Mr Fabian: In WA, there is the Enerdrill one that we have just used and I think there is another rig up north in the Canning Basin. There are a lot more on the eastern board; I am not familiar with the exact number.

Mr Clement: And there are different ratings to drill rigs. For what types of wells we are drilling, which are 3 000 and 3 000-plus metres of depth, that requires a significantly larger rig than, for instance, the smaller rigs that are drilling coal seam gas wells on the east coast. They are a much smaller rated capacity than what we would be using here.

Hon BRIAN ELLIS: Can I just raise the other issue that was mentioned this morning? The community is concerned, obviously, around water supplies, and quite justifiably so. To your knowledge, do you know of any water supplies that have been contaminated due to fracking?

Mr Fabian: No.

Mr Clement: I am not aware of any, no.

Hon BRIAN ELLIS: Why I am asking is I am trying to get to the bottom of the concern. I know that every mining industry has risks to it. Everything probably has risks to it. It seems as though this industry, the unconventional gas, has alerted people to emotions that require a lot more evidence to be given to them, and that is what we are trying to get to the bottom of. I am pleased to see that you are doing baseline studies too. That was probably part of the problem in the past. If they had baseline studies, proof probably could have been put to the community: this is what the quality was like before; this is what the quality is like after. When did you actually start baseline studies? Have you always been doing baseline studies or have you only just started?

Mr Clement: We have been doing baseline studies for the hydraulic fracture stimulation program wells, but for conventional well drilling, we have not been doing baseline studies on every well that we drill. We do have monitoring wells in place at a number of our facilities around the basin; for instance, at Dongara, we have a water well monitoring facility there and we had one at Hovea as well.

Hon BRIAN ELLIS: With your records of your fracks—I am not meaning in time, but in distance—what is the longest frack you have ever had recorded?

Mr Clement: We have only acquired microseismicity on the Woodada deep well, so that we do have scientific measurement capability on that one and proper measurement capability. I think in the submission you will see the measurements. In our written submission, I think it was of the order of between 200 and 250 metres was the longest that we recorded in that frack.

Hon BRIAN ELLIS: I know when we went to England, in one of the hearings one of the witnesses we had said that about 600 metres was the longest he knew of in this shale gas, because it is quite a bit below the watertable, but it is still a long way from the watertable.

Mr Clement: That is my understanding. In the industry internationally, 600 to 700 metres is about the longest frack propagation that has been seen.

Hon PAUL BROWN: Is that primarily just due to the sorts of pressures needed to frack any larger than that because of the ground pressure?

Mr Clement: Yes. The fracking is to open up fractures obviously in the rock, and the rock stresses themselves determine how far a frack will propagate and how much pressure you need to actually

make it propagate to open it up and propagate it. That is the stress regime in the rock, so it will be the depth and the quality of the rock as well.

[1.50 pm]

Mr Fabian: And also the size of the treatment. You can obviously make a bigger treatment.

Hon PAUL BROWN: That is right; the more pressure and the more pumps that you apply on site, you can get whatever fracture you want depending on how much effort you are prepared to put into it, so to speak. But you would not be looking to do that anyway; you would only be looking to apply the pressure required under your assessment of the rock and the shale area.

Mr Clement: Just on that subject, we are involved as a participant in the unconventional oil and gas business in the United States not as an operator, but as a participant with Marathon as the operator of the acreage that we are in there. The view on fracking there in particular is that the size of propagation is coming down. They are targeting much smaller frack propagations, so they are drilling wells now that used to be on 160-acre spacing and bringing them down to much smaller spacings and not trying to propagate the fractures as far.

Hon PAUL BROWN: Does that require more drilling then?

Mr Clement: It does require additional drilling in that circumstance, but they come to much cleverer solutions with that now where you will drill a number of wells from the one site. Whereas you were spacing the sites and having more sites, you are now coming down to a single pad and drilling more wells so that you do not have as large a footprint as you might have had previously.

Hon PAUL BROWN: So that is the multi-pads and directional drilling; that is the benefit.

Mr Clement: Single pads, yes. Directional drilling is pretty normal in the industry, particularly when you are going to drill a horizontal section at the end of the well.

Hon PAUL BROWN: I meant multi-well pads.

Mr Clement: Yes, multi-well pads.

Hon BRIAN ELLIS: Can I just pick up on that, too? A concern that has been put to us a number of times is about the impact on the environment. Can you just go through the process of what sort of footprint you take on the environment during the work stage and then when you leave the size of the pad? Just how much impact do you have on the environment, because I think a lot of people probably do not understand what the process is about?

Mr Clement: You will have the opportunity to see two of the sites tomorrow we are operating on. Typically, a well site will be of the order of 100 by 150 metres in area in footprint, and obviously we will have an access road in there, generally in farming property. Our experience is that the farmers generally like to keep the road, because we will build along a fence where they like to so they retain an access road.

Hon BRIAN ELLIS: So you work with the farmer.

Mr Clement: Yes, we work with the farmer, most definitely, where we can. We put in a water bore for the site and we have a licence from the Department of Water to extract water, and we will leave the water bore for the farmer as well. There are things that come that are of benefit. We will have that site 100 by 150 metres. On one side of the site, we will have the retention ponds that Mark was alluding to. We generally put the rig towards the middle, but not in the middle, of the site and drill the well. The well will be drilled, and it takes probably a month to two months to drill the well, depending on the depth and depending on the testing you might want to do on a well as you drill it. Once the well has been completed, if it is an exploration well—this is probably an example of how a well goes after you abandon it—if it is not successful, we will move into a decommissioning phase. At that phase, the well itself will be permanently plugged, as in put cement plugs right down at the formation that we were targeting up at the top of the next casing string, and then surface plugs

or just below the surface and we will cut off the steel below the ground level and return the site to what it was prior to that. We will leave a clear marker identifying the location of the site when we decommission the site.

If the site is successful and it goes to production, what we will do then is actually connect it up with the wellhead, so there will be a wellhead put on top of the well. The well has been drilled and there is production tubing going down to the reservoir and it is producing hydrocarbons. We will put a wellhead on top, and from the wellhead we will connect that by a flow line to either a larger pipeline or a gathering station or directly to, for instance, the Dongara gas plant. That will be buried, and there are regulations on depth of burial and access and how you do that, and we will return that pipeline site to pristine or original use when we have built that pipeline site. But at the wellhead, we will then fence that in in a smaller probably about a 10 by 10 metre —

Mr Fabian: A little bit bigger.

Mr Clement: — maybe a little bit bigger; 12 by 12 metre—wire fence to protect its security. All the instrumentation and equipment is inside that, and that is the end of our business there. The rest of the site we return to its original land use.

Hon BRIAN ELLIS: You mentioned putting down a bore for the farmer, or for your own supply of water. Obviously, the farmer will want fresh water, but are you bothered if it is saline water? I noticed when we were in the States, they are starting to use saline water.

Mr Clement: I might get Mark to comment on that, but, yes, saline water is a potential use for us.

Mr Fabian: Generally, we have been drilling down to the watertable and we are getting fresh water and getting our licence through the Department of Water for that. Then what we are having to do is add salts to that water to make it compatible with the formation that we are pumping into. A lot of the chemicals you actually add in the frack fluid are actually salt—sodium chloride or potassium chloride.

Mr Clement: You have a compatible drilling fluid, so the formation you are drilling through and the fluid you are using is the same, basically, so you are not getting flow in or flow out of the well. I think I understand where you are going. In the future, as you go to development, particularly with a number of wells on a site then, yes, I think you would go to reuse of water and potential use of salt water from deeper, saltier aquifers.

Hon BRIAN ELLIS: The whole point of the question is the possibility of moving away from the valuable resources and going to use up saline water.

Mr Clement: In that exploration phase, we are not a big drain on the freshwater aquifer, in fact, we are using very small amounts, and you will see in the submission; compared to the allotted amount that is being extracted from that aquifer, it is a very small amount that we are using.

The CHAIRMAN: Mr Clement, we have heard claims that the Drover-1 well poses a direct threat to the integrity of the water in the Mt Peron water reserve. Is this a claim that you are familiar with?

Mr Clement: I am familiar with it, because in recent months we have certainly heard that being brought to our attention as a concern the community has in terms of the water and water quality.

The CHAIRMAN: Would you like to address that issue now, for the committee, and put your side of the story?

Mr Clement: I think it is important to go back to the process that we have gone through as a company to get to the point where we have approval to drill and hydraulically fracture and stimulate that well. During our evaluation of the opportunity we did hydrogeological studies of our own. They were part of our submission to the DMP for approval to drill the well. We actually acknowledged earlier on that this will require some form of review by the EPA, so AWE took the view that we would self-refer the well, and we self-referred ourselves to the EPA. We took that

responsibility out of the hands of the DMP and said we were comfortable to go to the EPA for a self-referral. In the process that the EPA went through at the time, I think it is probably not fully recognised how much of a review process was involved there. In fact, the Department of Water was certainly consulted by both the DMP and the EPA and the Department of Environment Regulation was involved in that process as well, in their decision not to fully assess the proposal to drill and frack the well. That decision was subsequently appealed, and the Appeals Convenor, and ultimately the Minister for Environment, approved our proposal. We went through quite a considerable process over a very significant period of time—in fact, measured in months—to get to that approval at the end of the process. It should be recognised that the Department of Water in particular got involved and made a risk assessment of the proposal, as did other departments within the government, independent of each other, and certainly independent of our proposal. We were comfortable with that approach and we were certainly happy to go with what the regulations and the approval process required. As a participant in this industry we recognise that that is the way we operate in Western Australia and we were more than comfortable to do it.

[2.00 pm]

The CHAIRMAN: The only trouble is that there is a body out there with a view, which is being repeated often and in many quarters, saying, “Hang on, our water supplies are threatened.” How do we reconcile that with what you have told us? What is the missing link?

Mr Clement: We should also go back. We have been in a fairly continuous communication and engagement process since last year in relation to the drilling program this year, so we have been very open about what we have been planning to do. This has arrived relatively late on the scene, and has probably caught the regulators a little bit unaware. I have sympathy for that, because they worked through the process and at the time they were doing it, there was not an issue in the community being raised, and they worked through that process and, as you would expect the regulator to do, made a decision based on the merits of their valuation. Where we are today now is, yes, there is a body, and the community is concerned about the quality of water and risk of water contamination. I think that that is a communication issue, and more needs to be done to communicate that to those parties involved and to understand it. I also think we should recognise that for some there will never be resolution because some parties just do not want the industry to operate in Western Australia.

The CHAIRMAN: Has that been your experience—that it does not matter what you say, some people just do not want to hear it?

Mr Clement: It does not matter what we say; we are happy to talk and explain our situation to everybody. We have been very open about it and engaged with as many people as we could, and our experience is that there will always be some people who just will not agree.

Hon PAUL BROWN: Have you done baseline studies around Drover?

Mr Clement: We have done baseline studies around Drover, and we are monitoring as we speak, and we are reporting those results, I think, to the DMP, the Department of Water and the landowner.

Hon PAUL BROWN: Woodada used Gemec—I think that was the name of the company—as independent assessors. Are you using independent assessors for baseline studies in Drover and Senecio as well?

Mr Fabian: They would go through Gemec as well. I am not sure how to pronounce it.

Hon PAUL BROWN: Okay, that is fine, because that has been one of the issues raised with any of the assessments and inquiries: they should be done independently, and there has been some conjecture and confusion about whether or not it has been done independently, whether it be by the EPA or by an independent assessor of a reliable standard. I just wanted to be sure that it has been done.

Mr Clement: We are having it done independently, and the results have been going directly to the regulators and the landowners.

Hon PAUL BROWN: I had a meeting, outside of the committee, as a representative of this region, just recently and I think there was some suggestion that the DMP and the DOW were going to ask you to put in some additional water monitoring sites in Drover. Am I correct in that, or has that not been raised?

Mr Fabian: No.

Mr Clement: We have two sites.

Mr Fabian: We have two sites. After discussion, we put an observation bore on the western side of the lease. That was a new one that was just drilled, and there was some discussion. That might be the one that you are talking about.

Hon PAUL BROWN: There are also existing agricultural ones anyway.

Mr Fabian: That is correct, yes.

Mr Clement: And we are monitoring that as well.

The CHAIRMAN: We are probably just about out of time for now, because we have some other people that we need to hear from, so we might have to come back on another occasion to do that, and we are also looking forward to visiting some sites. We will do that in due course, but one that I want to flag with you, at least for a preliminary response, before my colleague asks his third final question, if I may, is the question of land access and your dealings with landholders. Again, you have got some experience in doing this in live situations. Have you had difficulties with the question of land access? Has it led to confrontation and disagreement?

Mr Clement: We have had issues; there is no doubt about that. The resolution of issues comes from communication. That is absolutely what my experience is. I should go back a step and say that on all the landowner sites that we work on we have agreements with the landowners in relation to access and use of those sites, and they are agreements between both parties for access and use of land. There is compensation for the access and inconvenience as well as, obviously, the temporary loss of the use of that land. We have those agreements in place. Yes, I think we are endeavouring to work as well as we can with landowners, and I think we do have a good record, and I want to improve that record and keep it going. We are going to be here for the long run and we certainly want to work with the landowners and be a partner with them, and that is our intent.

Hon PAUL BROWN: This is definitely the last question! You were in the back of the room when the Shire of Coorow was speaking to us and we heard earlier that they were talking about the EPA's role in regard to the industry, and in particular to their shire. We have had Irwin and Coorow today. How would you categorise the EPA's role in both Drover and Senecio? What have they or have they not done as far as playing a role to assess those drill sites?

Mr Clement: I think the EPA has fulfilled its role under the legislation that it operates under, whether this is a material project that should be fully assessed or not. That is not my judgement to make. I think that is the EPA's judgement, and that is why they work for that body and I work for my company. I think they have fulfilled the requirement that the EPA has to make that initial assessment. I believe that they have consulted with other government departments. They have actively consulted with a number of departments and got input from the Department of Water, DMP and the Department of Environment Regulation to ensure that they understand the decision they are making. I cannot comment on the basis for their decision, but they have acted in the way that the legislation is set up for them to act in this situation. I have heard the same comments about whether we should go for a full review, but I think also that probably the mistake is that the community does not understand that there has been a review process that this has gone through. It is not just that it came through the door and the EPA said, "This is not big, so pass it on." There has been a review

process that has been conducted by the EPA and the Department of Water and the Department of Environment Regulation have been involved in that. We understand that process, and we have been involved in it as well. I think probably the Shire of Coorow may have been better informed to actually hear that from them as part of their own review process.

Hon PAUL BROWN: So the DOW, the DMP and the Department of Environment Regulation have actually been providing the EPA with the information for them to make the assessment that they made that there was no need to have a more rigorous assessment, because they are happy with the other regulatory bodies and the role that they play.

Mr Clement: I understand that. I do not have evidence of what they provided. I do not have the details of that, but I understand that the Department of Water was consulted in relation to the drilling and hydraulic fracturing of Drover-1. The DMP was certainly involved, because they are the regulator of the industry. I understand they were involved, yes.

The CHAIRMAN: Gentlemen, I would like to thank you very much for your assistance in the course of this inquiry. We have received submissions from you in the past, and now we have had in-person dealing, and we have some visits in the field in due course as well. Thanks for your presence here today and for assisting us. Do you have any closing remarks to offer, Mr Clements?

Mr Clement: The only closing remark I would offer is that we are very supportive of this inquiry. I think that a fact-based review of hydraulic fracturing in Western Australia is important, and we want to make sure that we are providing you with what you require in support of the inquiry. From our perspective, as a company that is active in this business, we think that the regulations that are in place are appropriate, and actually do properly regulate the industry and have controls over the drilling and hydraulic fracturing of wells. We are comfortable that that environment will ensure that it is a safe and an environmentally safe operation. But, as I acknowledged earlier, we will go by the government, and the decisions that you make. We are just pleased that it is out in the public domain and being properly evaluated by the parliamentary committee.

The CHAIRMAN: Thank you once again, and we will bid you good day.

Hearing concluded at 2.10 pm
