

**ECONOMICS AND INDUSTRY
STANDING COMMITTEE**

**INQUIRY INTO TECHNOLOGICAL AND SERVICE INNOVATION
IN WESTERN AUSTRALIA**

**TRANSCRIPT OF EVIDENCE
TAKEN AT PERTH
WEDNESDAY, 16 MARCH 2016**

SESSION THREE

Members

**Mr I.C. Blayney (Chair)
Mr F.M. Logan (Deputy Chair)
Mr P.C. Tinley
Mr J. Norberger
Mr T.K. Waldron**

Hearing commenced at 11.09 am

Mr SHAUN GREGORY

Senior Vice President and Chief Technology Officer, Woodside Energy Ltd, examined:

Mr BRIAN HAGGERTY

Vice President, Innovation Capability, Woodside Energy Ltd, examined:

The CHAIR: Good morning. On behalf of the Economics and Industry Standing Committee, I would like to thank you for your appearance before us here today. The purpose of this hearing is to assist the committee in gathering evidence for its inquiry into technological and service innovation in Western Australia. You have been provided with a copy of the committee's terms of reference. At this stage, I would like to introduce myself and the other members of the committee here today. I am the chair, Ian Blayney. With me is the deputy chair, Hon Fran Logan, and committee members Jan Norberger and Hon Terry Waldron. The Economics and Industry Standing Committee is a committee of the Legislative Assembly of the Parliament of Western Australia. This hearing is a formal procedure of the Parliament and therefore commands the same respect that is given to proceedings in the house itself. Even though the committee is not asking witnesses to provide evidence on oath or affirmation, it is important that you understand that any deliberate misleading of the committee may be regarded as a contempt of Parliament. This is a public hearing and Hansard is making a transcript of the proceedings for the public record. If you refer to any documents during your evidence, it would assist Hansard if you would provide the full title for the record.

Before we proceed to the inquiry-specific questions we have for you today, I need to ask you the following: have you completed the "Details of Witness" form?

The Witnesses: Yes.

The CHAIR: Do you understand the notes at the bottom of the form about giving evidence to a parliamentary committee?

The Witnesses: Yes.

The CHAIR: Did you receive and read the information for witnesses briefing sheet provided with the "Details of Witness" form?

The Witnesses: Yes.

The CHAIR: Do you have any questions in relation to being a witness at today's hearing?

The Witnesses: No.

The CHAIR: Do you have an opening statement?

Mr Gregory: Thanks, chair. Thanks for the opportunity to address the committee at today's public hearing. Woodside provided a written submission in September of last year and we are here to respond to questions that may arise from that submission, so I will just give a brief opening, if that is okay.

Woodside is Australia's most experienced LNG operator and we believe that technology and innovation are essential to unlocking future growth and more efficiently commercialising assets. We are focused on continually expanding our technical knowledge and discovering new solutions. Innovation is part of our company's DNA. Our knowledge has been built through experience dating back to the 50s and we continue to pioneer remote support and application of artificial intelligence

and advanced data analytics in our operations today. Our continuing commitment to explore and embrace technology has been a major contributor to our success. For Woodside to remain competitive we need to adapt and innovate and work collaboratively. We are also cognisant of supporting the growth of science and technology within the broader Western Australian community and see significant value in doing so. Collaboration is an essential element in the fast-paced innovation industry, so no single company can be across all the cutting-edge developments. Rapid innovation is crucial to our industry and we must be equipped to embrace disruptive change. We see an opportunity to accelerate innovation by collaborating with start-up companies who are able to quickly develop new techniques. Through collaboration with entrepreneurs in the local community there is an opportunity to foster a world-class ecosystem of innovation in WA.

On innovation, innovation can occur through different processes. They may include disruptive change, step change or the pursuit of continuous improvement, and we see these as different. Innovation is most productive when directed by identified problems. Collaborative partnerships between industry, researchers, entrepreneurs, subject matter experts and parallel industries that focus on problem sharing can lead to problem solving. We believe that collaborative innovation is the key to future growth. We have established alliances through Woodside's FutureLab initiative that enable us to collectively share challenges and work together to develop innovative solutions. FutureLab is an example of an innovative collaboration that has already produced positive results for a range of stakeholders and to kick things off we would like to direct the committee's attention to our FutureLab brochure that Brian has—if you want to pass it—how we have expanded on this in the initiative. Thank you.

Mr J. NORBERGER: Great. Good to see you again, Shaun. In your submission you state that Woodside is Australia's largest independent oil and gas company and the nation's most experienced liquefied natural gas operator. So, I think it is fair to say that companies such as Woodside are obviously taking advantage of the federal government R&D tax incentive. You also mentioned the commonwealth Industry Growth Centres Initiative, which is great. However, at a state level, could you maybe tell us what Western Australian initiatives you are aware of that encourage industry R&D and innovation.

Mr Gregory: Industry R&D at a state level, I think probably the highlight one that we have been involved with when I look back almost a decade would be WA:ERA when the state government took an initial position on: this is what we wanted to do for WA. We saw an opportunity and had a co-investment with industry to kind of kick things off. And we have seen that over about 10 years now and the state initiative to kick things off was a good starting point and then industry kind of followed and then we have kind of taken it from there and that continues to serve us well today. That is a big ticket thing for us. It also encouraged and brought the universities together. So, one of the hardest things for us in industry is that lots of people knock on your door and all these different priorities for them, and how do we engage with them in a coordinated way that is not competitive. Because it can be a bit competitive out there for those universities and it is probably more so today as they fight for students. So, where that brings some alignment, that helps and the state can absolutely play a role in that.

Mr J. NORBERGER: Okay, cool. So, do you think there is more we can do?

Mr Gregory: I believe so. I think everyone should be looking for new ways and especially the pace. If I look at one of the things that has changed the most for me over the past, say, 10 years but even the last five has been the pace of innovation. The requirement to be competitive today is higher than I have ever seen and it is not going to get any slower. As we look around, how do we help everyone come on board for that pace of change? One way to get around that is to help people in: What is it that you are after? So, what is the direction? Beyond the directive vision that you might have at state level, the next tier down is: what is your blueprint? And helping us all in a line along that blueprint and avoiding when there is overlapping or inefficiencies in engagement, so

I think that is one area. The next is: what is the blueprint for the state in innovation? I think, too, the state has a role in: what is it that you want to be an expert in? Because it is not everything because then you are spread not enough, too thinly, so where are those areas? I think the science statement is another good example that sets that high level—these are the areas, here are the supporting industries and then, for me, it is: okay, so what is next?

Mr T.K. WALDRON: Your submission mentions your involvement in the Australian Research Council projects grants in 2015. I just wonder whether you could give some more details about those grants. I know they support research at UWA et cetera. What do you see is the value of them, your involvement and have there been lessons learnt from those grants?

Mr Gregory: They are the grants that are just kicking off.

Mr T.K. WALDRON: 2015.

Mr Gregory: Yes. What have we learnt, again, if we take a look at our FutureLab program and if I go back to my opening, innovation is not about new ideas; it is about solving problems. It is through solving that problem that you are going to get innovation and value back. So, for us, it has been, “What are our problems?” So through FutureLab we expose—and if you have a look at ocean engineering, we exposed the problems that we have in ocean engineering and then we engaged through ARC and the universities and then formed a collaboration to address that problem. I think we were successful partly because we brought the problem that we would then say, take an example on mooring: why is mooring such a problem for us today? Well, we had a drill rig lose a mooring recently and come over our facilities. That is not good. So, we continue to invest in moorings and as we look forward, we are going to be doing more and more in that and we need moorings, you know, so that is the problem. We publish the problem, we collaborate with the universities on: what do we really mean by moorings, what is the real problem? Then they collaborate on putting the proposal together and then out comes ARC funding aligned to that one and we have got, as I said, plans for the future, enterprise analytics and we will continue to evolve this and add problem themes in that statement.

[11.20 am]

Mr Haggerty: I might just add that learning in that process, things like WA:ERA enable a collaboration to occur, and we can align with other people in the industry, so it is a lot more forceful if the whole industry lines up and says that this is the type of research that we look at.

Mr Gregory: Yes; it is an important point because within industry, in the same industry collaboration, it can quite often be competitive around the intellectual property, so you need to be very transparent up-front to deal with it, otherwise collaboration is not really going to work too well, because you end up with lawyers.

Mr T.K. WALDRON: Do you see yourself being continually involved in that linkage project scheme into the future?

Mr Gregory: Sure.

The CHAIR: Can I just ask you there: where you have got companies that work in different countries and they research in different countries, but then we are sort of suggesting to them that they operate here in Western Australia; it is a good thing for them to work together in one place doing research together, how often would you envisage something like that having stumbling blocks for IP?

Mr Gregory: Stumbling blocks for IP? IP is always the stumbling block; let us not kid ourselves. You need to address it up-front very clearly. Geographically challenged? I think more that comes to your collaboration partner and where they have their R&D headquarters. If it is not in Perth, then you have got an issue in who is owning that IP and where is it geographically housed. That needs to be discussed up-front, again. If you cannot get up-front principle alignment, then it is a stumbling

block. But I do not think it is necessarily related just to the geographic location. You could have an issue around, “No, it’s my intellectual property; I’m bringing it and I want to protect it” versus the researcher who thinks it is theirs. You need to get that principle alignment up-front.

The CHAIR: What do you think is the optimum structure to have almost like common research here in Western Australia? Would it be to have all the companies being a percentage share in all the IP, or does that particular bit of IP belong to that company because they brought that to the table in the first place, or what?

Mr Gregory: For me, it will always depend. I do not think there is a one-size-fits-all solution to the IP problem and the IP sharing that is going on because it is very rarely new IP that you are talking about—just new. Generally, you are bringing background IP from two parties together, then you are improving it for who owns it jointly. In our experience, it is very rare that it is just single IP you are talking about. You are always both contributing, if there are only two parties, but it gets worse if there are three or four; you are contributing background IP. Generally, what we put on our page, on FutureLab, is “IP we are willing to completely relinquish.”

The CHAIR: So, who would own it then?

Mr Gregory: Whoever brings the solution to our problem. So, again, I encourage my co-collaborators in industry that when we talk about collaboration, what I talk about first is collaboration where you do not want to own the intellectual property, and then it becomes available for the solution provider—call it UWA or a start-up company. What we want in the end is the application of that intellectual property. That is where we will see the most value most of the time. If we see value in the intellectual property, we generally will not be collaborating necessarily in the early stages until we understand what that opportunity is. So, when we go and say, “Ocean engineering on mooring”, if someone comes up with a fantastic new mooring, given our problem, you own all the IP; that decision has been already made.

Mr F.M. LOGAN: Just taking that idea or that concept that you have just outlined forward, this is what I put to Shell—that is, for companies to survive into the future, they have to be innovative and nimble in their thought and deed, and that includes corporations as well as start-ups. In the conservative industry of major oil and gas, how will Woodside approach innovations that are brought to your front door for applications? This is not ideas; these are applications to possibly improve on efficiencies, but they are not a problem that you see at the moment because, as you know, that is an issue for the major oil and gas industries; they are very conservative in trying things out new. As you know, they would say, “Yes, that’s a great idea—fantastic! When you’ve got it in the field and someone else is actually using it, come back and see us.” How will Woodside approach that in the future?

Mr Gregory: We recognise that same problem. Probably it is now five years ago that we set up a new division, so we have a technology division that I oversee. It has evolved now to the point where we have absolutely addressed this issue around being nimble, looking at fast-paced, two-day, two-week, two-month-type trials and keeping the prototyping small, so the consequence if you fail or there is a problem is lower. I talk a lot to my own group and to others around, “You need to think big, prototype small and scale fast when it comes to innovation.” Thinking big is: make sure the problem is a big one or the value capture is a big one, because you are going to take some risk here, to your point. But then prototype small; do not go and put it on a 100 000-barrel-a-day facility on the very first attempt, because if it goes wrong, you are in trouble. So what is the minimal viable test that you could do in a week, a month that can say, “Yes, this has got merit”, that then sets you on a path? I think that the timescale—we know, as an industry, we are very slow to innovate traditionally, but that is not the case today. I have examples where we have 3D printed something that is completely new in industry and we are looking to install inside six months from idea to install it on an operating facility. That comes from what is the minimal viable product, small prototype. Fail? If you are going to fail, it is not going to be a big consequence. If it succeeds, then

scale fast. They are the last two words of that six-word phrase—scale fast and get it in, because that is traditionally where innovations, or the valley of death that you will hear about, come from—that is, in scaling fast.

Mr J. NORBERGER: We know that Woodside is a great supporter of the Premier's science awards, you are and also the sponsor of the early career science award and the Woodside–Scitech science awards. What do you see as the main value of these awards, be it for Woodside, for the industry and the community?

Mr Gregory: Woodside is historically a science and engineering–based company. When I talked about it, innovation is in our DNA; science and engineering is part of it, and it is growing. We truly believe in growing STEM, and we take an enormous number of graduates in every year and we develop them; they are the lifeblood of the company. We have internal metrics to kind of grow from within through a big graduate intake. For us, as a company, it is an investment in the long-term development of good graduates coming out of universities and promoting science to our youth.

The CHAIR: I am going to brag here and say that in their final year of primary school, my twins won the boy and girl Scitech awards!

Mr Gregory: As a Woodside person, I have awarded the book at plenty of schools.

The CHAIR: Thank you for that!

Mr J. NORBERGER: How might we raise the profile of those awards then, and also the profile of scientific research in this state in a general sense?

[11.30 am]

Mr Gregory: That is a good question. I have spoken at length with the Chief Scientist about this. I think we as a company and we as a state do not really promote ourselves very well nationally nor internationally on some of the good work that is happening in this space. I think we need to tell some of the success stories better because I think it is through those success stories that we will penetrate further into the schools, the parents, the kids that have them striving to achieve those awards and study those subjects with enthusiasm. That connection to where it leads is, I think, one of the biggest things we can do. I have kids as well who are 15, 13 and 10 and they do not see that connection to what they are studying to where it leads very easily. I think the more we do in that, the more it lights them up and they get enthused. I think that is where we could do more.

The CHAIR: Once the Oil, Gas and Energy Resources Growth Centre is established, how would you like to see it operating and what role would Woodside see themselves playing in that?

Mr Gregory: We have been an avid supporter from day one, even in its prior incarnation. We gave feedback to Ken when he was doing all the collation of what this growth centre will look like. The number one thing is to assimilate the problem areas and where the research is so that everyone knows what is going on and where the interest is to really then say, “I'm really interested in that; we'd love to collaborate in that area”, and just stop repetition. That to me was number one. When I was talking to Ken, number two was almost “see number one”. It is so important to get that because a lot of the time you just do not know. There could easily be a mooring company that does not know we are investing in mooring. That to me is something that I see as the number one area. Then to prioritise and to tell the stories about where the growth is, what the issues are so that people start thinking about bringing new ideas to the table. I know Brian has done a lot of work with Ken in that lead-up, if you want to add anything to that.

Mr Haggerty: The only other thing that we are asking Ken to do is to make effective that inter-industry collaboration. There are a lot of advantages. The coal industry is stressed at the moment and that actually breeds innovation. It would be valuable for us to learn from it. Getting that inter-industry collaboration is important.

The CHAIR: You referred us to the innovate and prosper report, and that is talking about university and industry collaboration. From your perspective, what particular gaps should that look to address? This is an area where Australia does very poorly. Have you seen other models elsewhere that you think work better than they should look at using here?

Mr Gregory: How we particularly relate to university?

The CHAIR: Between researchers and industry—commercialising research.

Mr Gregory: I have seen multiple models and I think you have also toured to see how these different models work. I have my chief economist currently scouring Boston for best practice in commercialisation models, so looking at what is working there to date. The other thing that happens that evolves quite quickly is what models they are seeing coming out of Boston right now as it relates to us commercialising some of the innovations coming through our pipeline. I think it gets back to the clarity and options around intellectual property again. What are some of the case examples—publishing those—and what works? There is a role almost for government to say, “Here are three options, here are the pros and cons of these options for commercialising.” It does not always necessarily mean the IP owner is the one who is going to make the money; it could be through a joint venture company that is formed and the intellectual property is licensed. There is a royalty, there is an equity and there is a complete sale. What models are there? When we went to look at the commercialised summit, even we were stuck with which one to use. What ones are there? We are currently scouring for those. It kind of depends again on what that objective is. Is the objective to royalty, licence or go global? Is it as a service? Do you want to scale and sell the company? I am sure that the researchers do not understand, let alone industry partners as well.

Mr F.M. LOGAN: Can I just come back to that issue of the Oil, Gas and Energy Resources Growth Centre and your comments about that? What did you put, Brian, to Ken about what it should focus on? What do you think the growth centre should focus on? Is it research or is it application of technologies?

Mr Haggerty: The role is to facilitate the collaboration, to facilitate the process and to get the appropriate narrative, which has cascaded from wherever, and focus on that. It is around collaboration. It is not specifically coming up with our directions. It is around what do we need to focus on and what are the various industries interested in focusing on, and then appropriately moving those into the environment and research centres.

Mr F.M. LOGAN: What are we focusing on? That is not only a question for this mob, but it is also a question for state governments as well. As you said earlier, Shaun, do not spread your small amount of resources too widely in the area of oil and gas, where those resources are, because remember a future government will have a bundle of money to spend in this area. Oil and gas is just one stream of that. What do you focus on?

Mr Gregory: The reason we put FutureLab together is to answer that exact question. We are focusing on issues around ocean engineering and plant of the future. Ocean engineering for us is more a medium-term objective. Plant of the future is a more long-term objective and enterprise analytics, which is big data and artificial intelligence, is a near-term investment. We answered that explicitly on those three areas. Then people said, “What do you mean, Shaun, by enterprise analytics; what are the issues?” We put some bullets behind that and then we say, “If you want more detail, please come in, because we have probably found a collaboration partner.” It could be a researcher but it could also be, and to your point, is it researcher applied? It could be a small company, which we deal with here up in West Perth, who said, “I’ve got something off the shelf for you.” I am like, “Brilliant. Let’s do that.” With enterprise and analytics, we are investing in both—applying something that was off the shelf from here in West Perth to if we are having to go back to R&D and advance applied mathematics because the problem is still in equations and they need to make them simpler.

Mr T.K. WALDRON: Just on the universities again, your submission outlines that you support academic positions at WA universities. What is the feedback from that? Can you ascertain from that the benefits to Woodside and will you continue to do that?

Mr Gregory: Absolutely. The benefit is twofold. There is the immediate benefit of getting problems worked on. That could be through R&D or actually service work. I do not think we need to do more on advertising. We do some of that service work through the university. Then there is the long term—the building up of the funnel of scientists in that area; for example, corrosion. One of the biggest things for us right now is if you think of steel in a salt environment, guess what? It corrodes. We need as much R&D as we can get and a building of community behind that, of science, to address corrosion and hence we sponsor chairs in corrosion. You sponsor students that kind of build that up. We also sponsor in material science—the next generation materials, the next generation fixes that are not what we would use today. We are trying to address both retrofitting the existing and then let us not make the mistake again the next time we put steel in contact with salt.

[11.40 am]

Mr J. NORBERGER: How do you rate our graduates?

Mr Gregory: I get continually surprised at the calibre. They are outstanding. People say, “Can it be better?” Absolutely. We find gaps, we plug their gaps, but, my goodness, they can take on a lot of tasks. I am kind of humbled by what they are able to achieve in those first few years. We often hear the rhetoric of, “The graduates aren’t fit for work.” Yes, there can be some skills they should add to their portfolio. Maybe it is because we attract so many. We have, I think, around 7 000 applicants for our hundred over the course of the year, so we are privileged in getting high calibre coming through the door, but they really do make you humble on what they can achieve. I rate our graduates very highly. I think when you get to areas for improvement, the universities have got the message around it being deep and broad; you cannot just focus solely on one discipline, the reason being the problems we are having them address now are ever more complex, so they need a broader understanding. When a graduate joins us, they spend three years in a program, and each year they see a different part of the business. That is not a different part of process engineering; it is process engineering, and then you are going to go and do mechanical engineering, and then you might do commercial for six months and a stint in FutureLab, because we want them to get broad understanding, and that is around diversity of thought. I think that is the future. You need to know more about the end-to-end process as well as that deep technical knowledge that they got at university in their core subjects. Otherwise you cannot be nimble, because you are just not aware of those end-to-end interfaces which evermore increasingly are the issue.

The CHAIR: One of the major themes associated with supporting innovation in Australia is the relative lack of available risk capital for early stage commercialisation. Do you have a corporate venturing arm?

Mr Gregory: No, we do not. We looked at it seriously about 18 months ago. What we found coming through with companies that we would look to as a VC fund investing, because we wanted it to be focused in WA, were companies that we could buy services from today anyway. It was not serving the purpose that true VC funding is designed to do, which is accelerating incubation to applied, jumping in more around the applied company wanting to grow their business. We can do that another way, so it did not appear to be a mature time to enter WA in that space, and then the oil price dropped.

The CHAIR: Yes, okay. The world changed.

Mr Gregory: Sorry, it happened! My budget got cut!

The CHAIR: Tell the state Treasurer, mate!

But what you are saying is you did not see, really, an opportunity for yourself to be in there. There was not enough to make it worth your trouble. Is that what you are saying?

Mr Gregory: It was not mature in terms of the search of companies to invest in. Partly this was going to be a chicken and egg. Until we came out and announced a VC fund, you were not going to get people coming out from the garage saying, “I’ve got an idea; I’m just hampered by money.” That is when we went and invested in KPMG’s Energise program to have a better look at what other portfolio of companies are in that pre-stage where they needed VC funding, and tried to identify companies through that, where we may have taken an equity position in.

The CHAIR: So, would that be something, with this growth centre being established and growing, that there might be an opportunity then for someone to have something like that sort of plugged onto the side of it?

Mr Gregory: I think it is definitely a case of them bringing those type of garage-idea companies up more visible to the surface for industry to see, because, to be honest, we did not really see very much of it at that time. It was a few years ago.

The CHAIR: Okay.

Mr J. NORBERGER: I would have got Peter Tinley to ask this, but he is not available. Shaun, I do not know if you remember, but back in 2013 when we were doing the FLNG inquiry, Peter asked you, I think, what skill sets did not exist at that time or were not then contemplated in our tertiary system that would be fundamental to the future growth of Australia’s oil and gas industry. You answered at the time—I am not expecting you to remember; I am being very generous!—that materials science would be a big one. Your colleague, Mr Robert Cole, added that naval architecture was also an area in which WA was particularly weak. Admittedly, it is two and a bit, almost three, years later. Do you think anything has changed in that time period? Have we progressed?

Mr Gregory: It was almost like I sighed with relief when you mentioned those two topics! So why do we not follow through in ocean engineering and go and push that? We get the ARC funding so, yes, we push in that area. In materials science we did two things. We continued to invest in corrosion at Curtin University and drove that onto a higher agenda internally, and we made an investment at Monash University where, from our perspective, there is a very, very large materials science capability existing there that we redirected to our problem set. That was kicked off in January this year, so we did two things to address both of those around corrosion and materials science and ocean engineering, in particular.

Mr J. NORBERGER: A good example, then, of industry influencing tertiary evolution—call it what you will—where it was not necessarily led by the government. You saw the need and —

Mr Gregory: Correct. One was driving it and the other one was actually utilising and redirecting, so Monash has an existing capability jointly with CSIRO, which we redirected to our problem set, and that is creating innovation.

The CHAIR: Have you noticed any more gaps in the meantime?

Mr Gregory: We have had a huge investment recently in big data analytics and artificial intelligence, so that has highlighted areas that we again now focus through Curtin and the Innovation Centre to plug gaps in applying. Again, it is more application. It is very little around core R&D in that area, but it is applying the computational expertise to a different problem set.

Mr Haggerty: Part of the broadening that Shaun is talking about in graduates is that our graduates have got to understand data science. Even if they are not specialists in that area, it is important that they understand it.

Mr F.M. LOGAN: Just one final question, Shaun, is: have you brought any innovative ideas, possibly driven by the price of oil and the value of the dollar, to bringing Browse gas onshore, either around somewhere north of Broome or possibly to the North West Shelf?

Mr Gregory: Our company has been totally focused on being in FEED and everything that had to do with that. It is such a big project, we had to stay focused on that current development concept that is in FEED. All of the LNG technology internally in Woodside is focused on projects that are further back in the development pipeline, where technology is innovating absolutely to bring the cost of construction and the type of construction down and easier to do, so we are absolutely focused on that, but it is not currently—that is further upstream in the pipeline of projects for us right now.

Mr F.M. LOGAN: That does not answer the question! It is interesting, but it does not answer the question.

The CHAIR: I would like to thank you for your evidence before the committee today. A transcript of this hearing will be forwarded to you for the correction of minor errors. Any such corrections must be made and the transcript returned within 10 days from the date of the letter attached to the transcript. If the transcript is not returned within this period, it will be deemed to be correct. New material cannot be added via these corrections and the sense of your evidence cannot be altered. Should you wish to provide additional information or elaborate on particular points, please include a supplementary submission for the committee's consideration when you return your corrected transcript of evidence.

It is quite possible the committee might have some follow-on questions which I will just send to you by mail, if that is all right. Thanks for your time.

Hearing concluded at 11.49 am
