

ECONOMIC DEVELOPMENT AND INFRASTRUCTURE COMMITTEE
Inquiry into greenfields mineral exploration and project development in Victoria

Adelaide — 17 November 2011

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Mr I. Hardwick. Business Manager, Deep Exploration Technologies Cooperative Research Centre.

The CHAIR — Thank you very much for being here. I am Neale Burgess, the Member for Hastings. I am the Chair of the Committee. On my right is Martin Foley, the Member for Albert Park, and on my left is Wade Noonan, Member for Williamstown. Welcome to today's public hearing. This committee is an all-party committee and we are hearing evidence on the Inquiry into greenfields mineral exploration and project development in Victoria. The Economic Development and Infrastructure Committee is required to inquire into, consider and report on the benefits and drivers and barriers of greenfields mineral exploration.

All evidence taken at this hearing is protected by parliamentary privilege. However, any comments made outside this hearing will not afford such privilege.

Can you please state your full name?

Mr HARDWICK — Ian Hardwick, Deep Exploration Technologies Cooperative Research Centre. My business address is 26 Butler Boulevard at the Adelaide Airport.

The CHAIR — You are appearing here on behalf of your organisation?

Mr HARDWICK — Absolutely, yes.

The CHAIR — In your role as Chief Executive?

Mr HARDWICK — As Business Manager.

The CHAIR — So if you would like to proceed.

Mr HARDWICK — Yes. I have got a visual presentation and I kind of prefer these with our business because we are talking R&D and it can be easier to show people than talk. I am an accountant by trade, so I am not going to blow you away with technical information and scientific information. I do have one slide in there.

Overheads shown.

So Deep Exploration Technologies CRC, why was it created? We are trying to address the most significant challenge to the future of the minerals industry being the reduction in the minerals resources inventory due to high production rates and low mineral exploration success. In the Australian context mineral resources constitute approximately 50 per cent of the nation's exports. However, 80 per cent of Australia's mineral production is from mines discovered more than 30 years ago. So our core purpose then is to develop transformational technologies for successful mineral exploration through deep, barren cover rocks to be utilised and commercialised by the mineral exploration industry in order to replace the world's declining mineral resources inventories and thereby enable continuing improvement in global standards of living.

Now I have a couple of charts to give you an idea on consumption and demand. The slightly green bars there are the last 25 years where we consumed half of all the copper that was ever mined in the world. That chart goes back to 1900, but that period was half mined. Over the next 25 years we are expecting our consumption to exceed all copper mining again, on top of what has happened in the last 25 years. Copper is one of our core commodities.

The CHAIR — Copper will be exhausted?

Mr HARDWICK — Not if we find more.

The CHAIR — Anything that we know of at the moment?

Mr HARDWICK — Yes. This is the chart. I believe it is about 25 years at the moment. Based on those consumption rates, so yes, about right.

Mr NOONAN — Can you just tell us what is driving up demand?

The CHAIR — Yes. I guess growth in the population in China and India.

Mr NOONAN — What are we using it for?

Mr HARDWICK — We are using it for construction.

Mr NOONAN — Cabling. Construction cabling.

Mr HARDWICK — Yes. This next chart here is a chart plotting discovery versus exploration spend. So discovery is the blue bars, shaded green behind it is expenditure since 1950. Broadly speaking where there have been increases of expenditure, it has coincided with extra discoveries. Obviously there are some outliers there which you would expect in this sector, but what is noticeable is the last decade or so where the expenditure has been significant with very little success. I'll just qualify that by saying that perhaps you can see in the last couple of bars there are shades of grey where there is still proving up discoveries that have been found, to work out their consent. Even with those coming off it is still a low success rate relative to the spend. Really in simple terms the reason for that is the easy stuff has been found. The discoveries of deposits that were close to the surface are easy to find and there are still more down there, it is just down there and covered.

The CHAIR — In the '50s there was an extreme amount of expenditure which does not seem to have been followed by a great deal of discovery.

Mr HARDWICK — The bars are the discovery and the green behind it is the expenditure. I cannot actually tell you what discovery that was.

The CHAIR — Big one.

Mr HARDWICK — Big one, yes. This is sort of another slide highlighting — I suppose what I am talking about there is we have made a lot of discoveries in the early years, so the orange plot of Australia there is what we call outcrop shallow basement. So where there is little sedimentary cover over the mineralisation, most of the discoveries have been in those areas. There is some that sneak into the greens which is basement depth of less than five hundred metres and obviously very little anywhere else. So again sort of emphasising the point that a lot of the discoveries have been made at the surface which is hardly surprising.

This across the bottom is date of discovery and across the top is depth of discovery. Up the top is discoveries at the surface. These are your T1 deposits. They tell you exactly what certain amount of tonnes and at a certain grade, so the more big ones are in there. So the point of this one is that a lot of those discoveries are right at the surface and Olympic Dam is a little deeper, probably quite deep by those standards in the '80s. Somewhere between three and four hundred metres, but more recently the discovery has been made deeper.

This is my accounting. Looking at that, I think if I read the quote across the bottom: 'Our ability to mine profitably at depth currently exceeds our ability to explore successfully at depth'. What he is saying there is — —

The CHAIR — We cannot.

Mr HARDWICK — The cost in bringing it up from a depth is not enough to worry them from a financial perspective. It is actually finding it in the first place.

The CHAIR — Who said that?

Mr HARDWICK — Robbie Rogue. So we are a CRC, cooperative research centre. The first paragraph here is taken directly from the Federal Government Department at CRC which is the objective, obviously, of the CRC to deliver economic, environmental and social benefit to Australia by supporting end user – driven research partnerships between publicly funded research and end users to address clearly articulated major challenges that require collaborative efforts. Big mouthful.

Then there is a quote from Joe Cucuzza — who was one of the gentlemen who established this CRC from an organisation called AMIRA International, which is separate body for the mining companies —

'The DET CRC is an industry-initiated and industry-driven response to the key long-term challenge facing the minerals industry, that being the need to replace, through exploration, the ever-more rapidly depleting existing stock of mineral resources'.

There are currently 44 CRCs operation in four ANZSIC sectors: agriculture, forestry and fishing, mining, manufacturing and services. They have got all sorts of sectors lot of agriculture, transport, et cetera, but the one thing they have in common is the concept of collaborative research and end user focused research.

We are looking to develop more cost-effective, safer and more environmentally-friendly methods for deep mineral exploration. We are incorporated entity with an independent board, which is important. We have got about \$115 million of which \$53 million is cash and \$62 million in-kind support over eight years. That comes from the Australian Federal Government and our participants, and they include the State Government. So this includes miners, research providers and service companies. So the mining services sector. We have 12 projects running and they were scoped by industry, as I was talking about before, and there are about 100 different researchers around the country working on those projects. Some of those are the big universities and CSIRO and others researchers within some of the small to medium enterprises around the place.

We have a unique model of commercialisation of our IP through the service sector. One of the key concepts with setting up the CRC was that the mining services sector is the natural commercialiser of products and services. That is what they do every day and so we are not trying to be a research provider but more sit into a commercial operation.

That is the listing of our participants. We have all the big boys. Notably missing is Rio Tinto, but certainly the biggest diversified miners and biggest mining services companies, gold producers, and then the research providers across the bottom, and notably also the State Government is an essential or key participant now in our organisation, which means they contribute cash along with in-kind resources directly to our project.

I should say that when CRCs are established, or so I am told — I was not at the beginning of ours — but there is somewhat of a bid war towards states as to where those CRCs are going to be located. You would have thought Perth or Brisbane, so it was a clear stand by the South Australian Government to say that they want to support mining in this state.

We have a whole bunch of affiliates as well, which is at a much lower level. On the left-hand side are the junior miners, the middle two columns are mining and service providers, and the right-hand column are government surveys, geological surveys, so the Victorian Government is there.

I just wanted to show you a quick animation that Barrick prepared in order to try and convince their board to come on board with the CRC. I will see if I can get it going.

Animation shown.

This is a sort of jungle environment in the way exploration is currently done. A chopper would bring in the drill rig, some land cleared, a drill pad set up. You would obviously cause a fair bit of environmental damage. You drill a series of vertical holes to try to prove up your deposit, in this case the biggest gold nugget in the world. This is demonstrating the environmental impact of clearing all those pads. There has got to be a better way.

This is a coil cubing system brought in on a truck where you would drill — there is the deposit again — one big mother hole and a whole lot of lateral holes coming off of it. So rather than a series of vertical holes, there are these angled ones that send information back and forward through the drill hole and send it back to the head office where they are updating geological models and drilling in different directions. So real-time information is a big part of what we are doing along with these sorts of different drilling technologies as well.

This is really the same example in a more urban environment similar to Australia. So again the deposit, couple of mother holes with lots of laterals off it, updates back and forth.

That is the grand picture of the CRC, but there is a huge amount of little bits and pieces that go towards achieving that.

The CHAIR — You would be very happy with that find.

Mr HARDWICK — I would think so. I think he would move Adelaide if it was that one there. So, as I say, a whole series of projects to try and achieve that vision and I am not going to take you through them all, obviously, but three distinct — —

The CHAIR — I would be interested to hear a bit more about that.

Mr HARDWICK — Sure. About every single project?

The CHAIR — No.

Mr HARDWICK — I will see how I go. We have got three distinct programs of research, so perhaps one is all about drilling technologies, so faster, cheaper and safer drilling technologies. So we are talking about the development of new drill rigs and the development of looking at the drill bits themselves and trying to get longer life span out of them. We are looking at using carbon fibre drill rods rather than the heavy steel ones. Those sort of things. So the real bits and pieces of drilling.

Drilling is quite an antiquated art. You would be surprised if you go and have a look at an operation. You think it would be more advanced, but at the moment most rigs are not automatic, so there are 30 kilogram chunks of steel being fed down the hole, and most drillers that are old are missing a finger. You have not been a driller for very long if you have not lost one finger. So that is the sort of program 1. Program 2 is more about getting more information out of the hole. So if you are going to drill all these holes, you are better off knowing more about them. That is being able to look ahead of the drill bit and being able to see what you are about to drill so you can potentially adjust the way you drill in order to not lose drill bits down there and therefore have to bring it back up and lose time.

The CHAIR — How does that work; with a sonar?

Mr HARDWICK — Yes. Seismic techniques and sensors and all sorts of things. They are trialling a different bunch of techniques to try and achieve that. I cannot honestly explain to you the technology challenges involved in each of them. So that is sort of program 2, getting more information from the holes that you are drilling. Program 3 sort of complements the other two and is more about where do you look in the first place. A lot of work is done on that to target where you drill. What we are talking about primarily is what they call halos around the mineralisation deposit. Ordinarily in exploration if you drill a hole, you do not find anything, et cetera, they do take some information from that, but what we are talking about doing is where there is a deposit there is a distinct halo around it that could provide indicators that that deposit is there. So when you are drilling, being able to determine and identify what those halos are, what is it about the rocks that you are pulling up or the fluid that comes up with the drill fluid is important. This is also where the State Government is directly involved in our project 3.4 which is about producing, I guess, a state-wide map, on a better way of explaining that, but they provide a lot of pre-competitive data in the hope that that pre-competitive data will prompt explorers to spend some dollars. So that is the sort of work they are doing there, mapping work. That is where they provide most of their in-kind resource. Their cash gets spread across all of our projects.

The CHAIR — So this is happening in all states?

Mr HARDWICK — This is happening in all states? Well, sorry, what do you mean by that?

Mr FOLEY — Your work is national but it is applied in regard to your partners.

Mr HARDWICK — Absolutely, yes. So the researchers are all over the country, but participants are some in this country, some not, but head office is here and our mine site, our test facility is here in Adelaide as well, which so happens that Carol sits on the remediation board of that mine site. Our portfolio of projects includes a mix of incremental and step-change projects. So recognising that there are some things that are currently going on in exploration that you can make real improvements on.

I talked about carbon fibre drill rods before. Other things like one thing that we are quite close with is a rod positioning sensor. You need human interaction at the moment to line up the rod, but we are really close to having developed a cool positioning system that will change that. Those sort of things I guess are incremental changes and they can make differences right in the here and now to what people are doing and they are designed to be bolt-on to existing drill bits because you cannot replace the whole set of fleet of drills overnight.

What we saw in the animation is step changes. A couple of examples of what we are doing there is a coiled tubing drilling system, initially for greenfields exploration, it is easier than brownfields exploration. You do not need to be directional. It goes down and grabs the sample you want and gets it out. It does not have to

necessarily be a perfectly straight line or do anything fancy. So the initial plan is the greenfields coiled tubing drilling in the future.

So the way exploration works at the moment is that you go down and you get a core, you send it off to your capital city where it is assayed, and you might be two months from getting the red light results of that by which time the drill rig has moved on and gone elsewhere. You know where the hole is, you can go back, but that is expensive and time consuming. So we are about developing technology, we are also about adapting existing technology. So basically to create a lab on the rig. So literally as you are drilling, with the drill fluid comes the powders, rock powders and chippings and being able to analyse those out on the drill rig and get that information virtually overnight. So when we talk about real-time in exploration, we are talking overnight or two days is time enough. So we are not talking telecommunications real-time.

Mr NOONAN — The accuracy would be as good?

Mr HARDWICK — Yes, possibly not, but that is again what I am saying about what the markets are actually demanding. You need it to provide some evidence and to guide your next decision. We do not necessarily have to work towards having it as good as a lab assay core. That is a couple of examples there.

So we are focussing on three things that would interest you the most which is coiled tubing drilling which is really our flagship project. The Brukungu Drilling Research and Training Facility and the example of potential collaboration with state-based geological surveys and as an example with PIRSA at the moment, we are in preliminary discussions in terms of what we might be able to do with them in some of the technology that we are developing.

Coiled tubing drilling. What we are talking about here is not new necessarily. Coiled tubing drilling is used in the oil and gas industry and it has been for a little while. There are thousands of wells drilled annually by coiled tubing but the difference is that in the oil and gas industry their geography is soft sedimentary rocks. We are dealing in the hard rock environment and that creates most of the challenges here. What they are able to do in two or three hours is move in, set up the rig, drill 100 metres an hour, two wells a day achieved and that obviously improves costs, there is hole stability and good safety and environmental impact. Spinning off a coil rather than manual handling of rods hits your safety targets and not having to clear vast amounts of land hits your environmental targets. So this was the chosen path. There was about a year of work done before we decided to go with this next generational rig, and so we decided to go with the coiled type as it is able to adapt as getting through the hard rock environment is hard. It needs to be spinning at 20,000 revs per minute, your drill bit, which is fine but being able to get the power down the hole to do that is another challenge in itself. The positive is the durability of the coil itself. You know, if it is only going to last two unwinds before you need to replace the whole lot then the cost will start to blow out. There are some definite technical challenges there but the guys are excited and we hope we can deliver it.

Again, the example of a step change. If we are able to get to this point where we have got a prototype that is being used out in the field at the end, at the conclusion of an eight-year life that is probably where we are aiming. That would include the lab on the rig at the back as well. So that is all we are shooting for and that would create confidence in the CRC and hopefully more investment, whether that be from the government, participants or both, and then you go on to do the brownfields rig. So that is coil tubing, another picture of it there.

So I have got an animation that shows this coil tubing rig. Our animation is being developed at the moment so it is not quite done, but hopefully it is going to give people a visual of what we are trying to do but also focus our researchers in on the end game which I am very big on. So at the conclusion of this animation there is about ten seconds of pretty funny stuff.

So drill rig pulls up with coiled tubing on the back of a ute. Two guys can operate it comfortably. It is easy to set up, just a few links to put in and then they are off. It is going to go down really, really fast, high rev at a very narrow hole sending up bits of rock powder as it goes which can be analysed on the back of the rig which I was talking about. So that is it going down. In a second it is going to show, I guess a pattern drilling as happens in the exploration industry. So obviously a miss and another miss and there is the kidney bean there, there is your deposit and around it is the halo I was talking about. So you hit the halo. You have worked out something is nearby and you work out where it is and you hit the deposit. So that is sort of coil tubing in a nutshell.

The Brukunga Research Training Facility is another one that we are really excited about which I guess we always knew we were going to have somewhere to test all these technologies and we have been very fortunate in that we have managed to negotiate a lease with the State Government over a disused non-remediated mine site in the Adelaide Hills, Brukunga, which was abandoned, I think, in the late '60s, and then the State Government took over its management after that. So what that gives us is a real live mine site and what we have got up there is one of the best oil rigs which has all the bells and whistles on it and it allows our researchers to go up there and put whatever they like on the drill and see what it is doing and break it if they want to and whatever. It sounds pretty simple, but if you want to get on to a real production mine, it is very difficult. Obviously OH&S is an issue. They do not want you there to start with. Even if you can get on there, the cost is, I am told, something like \$10,000 a day. If you are doing that, whereas we are able to prove this to people for nothing and you have a real drill rig up there to do on it.

The other thing coming out of this is there is a CFS, our Country Fire Service — I do not know what you guys refer to it as — facility adjacent to the site, so they have classrooms and a mess hall and some accommodation. Kind of similar to dungeon-style. So we can replicate a fly-in-fly-out-type scenario where we can run driller training courses. That is not a core business of the CRC, not really what we are trying to do, but it seems too good an opportunity to waste. So what we are trying to do now is facilitate the establishment of a permanent driller training school, and what we are doing is going for the drilling industry and saying: 'Guys, you are telling us there is a skills shortage. We have got a drill rig for nothing, a site for nothing, the accommodation is dirt cheap. If this does not work, then nothing will basically'.

So we have run a couple of pilot programs, and what we did there was put through 24 long-term unemployed indigenous students and 17 of those went on to be employed in the drilling industry. Even the ones who did not get employed is a bit of a success story in itself because what happens is a lot of people want to go into the mining industry because it sounds great, earn lots of money and save for a couple of years and be able to buy a house. What they cannot handle is the fly-in-fly-out, the camp style arrangement, no alcohol. So I guess weeding out those people is actually saving somebody money at some stage.

So that is just a bit of postcard. We have got our official launch of this site on Monday. Carol is on the remediation board that is invited to come to this. So this is just a bit of publicity. Brukunga is Australia's first purpose-designed site for drilling technology testing. So I think that is 45 minutes from the airport. Again, another quote from one of our affiliate companies which is very actively involved in our projects where he said:

Had this facility been available when Globaltech was being established, we would have located in Adelaide, not Perth, in order to take full advantage of the facility for technology testing.

So you have got small companies who for them \$10,000 a day to test their stuff is too much. Very, very appealing to have a site they can come to and test whatever they like. So I have got a brief video on the Brukunga site which will give you a bit of visual. It goes for not very long.

Video shown.

Mr HARDWICK — So that is a little bit promotional but that gives you a bit a picture.

The CHAIR — That is okay. We are probably not buying anything.

Mr HARDWICK — And we are not selling anything. That is the beauty of it. So we do not have to worry about that. So that is Brukunga. The final thing I wanted to talk about was potential collaboration with geological surveys. I was talking before about PIRSA and the pre-competitive data that they provide. I think they take really seriously and putting a lot of investment in there. One of the things that we are talking to them about, particularly with their Program to Accelerate Exploration, PACE program, is that at the moment they are operating a regional drilling program, so that is pattern drilling throughout a specific region on a five by five, say, case scale, and if you can do that and you can do it quickly and cheaply without technologies, and be able to identify those halos I am talking about, what we can do is actually be able to identify every mineralisation system in the province. If you can provide that to exploration companies that is when they start spending their exploration dollar with you. When we talk about the regional drilling program, we make sure there is a market demand for what we are trying to develop and this is why we are sort of trying to sit at the table with PIRSA or others at the moment with this coil tubing rig with the lab on it. Let's say we were able to produce the CT rig that is capable of drilling to recover, so we can overcome the technological challenges of getting through the

rock, \$50 a metre whereas it is \$100 a metre for the same type of drilling, get the sample and then using some of the other research activities that we are doing around halo, identifying halos and alteration methods, et cetera, that on a five by five grid pattern you can identify everything down the bottom with a 100 per cent chance of identifying all mineralised systems.

This first slide you do not need to be able to read the words here. This is the Olympic Domain example. All the dots mean existing drill holes, these broken holes. You can see a lot in the blue areas, clustered together. The blue means that they are very shallow, to the depth of basement cover and Olympic Dam and some of the other bigger ones in the middle there are at a slightly deeper depth. So what we are talking about is this pattern drilling, so in the same area, it is a little bit hard to see, I am sorry, but the red dots represent areas that you would need to drill to about 500 metres to get through the cover. The blue dots are more like that shallow level. So based on that, PIRSA are telling us in that region 50,000 metres of drilling based on a five by five area is a cost of \$26 million dollars. It is a lot of money but it is not a lot when you consider the tens of millions of dollars that would be spent on exploration and potential hundreds of millions of big discoveries. So that is sort of what we are talking about with them.

That is what we are working towards, which is pretty cool. It might not be the State Government does this. It might be that a particular licence holder does their area on a pattern scale because it is now affordable to do so or it may be that state government does it in conjunction with the licence holder and subsidises it some way in using the PACE scheme. I do not know. We do not know. It is too early.

This is where we are up to. We are about a year into all of our projects. We have decided to go with the coiled tubing system. We looked at what they are doing there and starting to order the parts to put it together. We have started our test hole at Brukunga and we had to get through a few hurdles with PIRSA to start drilling but it has been fun. Then we have also run the three driller training pilot courses. I have talked about those.

The other thing I have not mentioned is we have also got a target to have 40 PhDs completed. So we sponsor PhD projects to the tune of \$25,000 per year per student. We are trying to get 40 completions. We have 18 underway which is a good start. They work on their own projects but they are very much linked to our projects. That is all. So thank you for listening to that.

Mr FOLEY — We are no experts; copper and mineral are not a deep minerals issue but certainly gold is.

Mr HARDWICK — Yes.

Mr FOLEY — And we have heard differing views about the prospectivity — not the prospectivity but the ability to lock in your original quote from one of your partners, you know where it is. How applicable is your approach to the Victorian geological prospectivity issues particularly around gold?

Mr HARDWICK — Well, I think that it is considerably. If you are trying to encourage exploration spends in your state, I think particularly what I was talking about with the pre-competitive data that you can provide people to actually give them a little bit of an idea of what they might be spending their money on. It is definitely a way you can give it a boost. Yeah, as I say, the mineral sands perhaps not so much but certainly copper and gold and uranium, absolutely. There is plenty of cover in the State of Victoria that can be explored.

The CHAIR — What's your feeling on the prospectivity in Victoria?

Mr HARDWICK — I could not comment. I do not know. My background is, as I said, I am an accountant and I am six months into this role and I do not know enough yet geologically.

The CHAIR — That is okay. Not a problem.

Mr NOONAN — The Victorian Government was looking to encourage greater greenfields exploration, and I take from your presentation that the sort of technology that is available allows the next step, I suppose, in the pre-competitive data, so really this is a question then for state governments to determine whether they want to invest more heavily to provide an additional layer or quality of information than what they might have because you are really talking about technology that takes into account the deeper or the undercover data which is not currently available for most state governments. Have I picked that up right?

Mr HARDWICK — Yes, you have. It is not just that. You know, currently state governments are not providing — they provide data from drill holes that they do not do themselves. What I am talking about, I suppose, is in some way governments being involved in funding the drilling in order to provide that data. So that does not necessarily have to be undercover. That can be any form of drilling because it is currently not happening. But also generally supporting if we put aside the regional drilling program for a moment, just generally supporting the exploration sector, what we are trying to do here is develop technologies that allow the whole process to be cheaper and more environmentally friendly. It can be hard for me to say, you know, environmentally friendly because what we are talking about is I guess the logic is the more you drill the more you find. Within reason. You obviously drill where you think there is a good chance of success, but no-one ever really knows and so it follows that the more you drill the more you will find some. It is hard for us to wear an environmental hat, but I guess the type of drill rigs that we are proposing definitely do have less environmental impact than the existing. So yes.

Mr NOONAN — How many drill holes have you put down and in what timeframe?

Mr HARDWICK — Us? We have got one in Brukunga in the space of a year. It is about 20 metres deep at the moment.

Mr NOONAN — What is the potential return if you hit this halo that you describe? You are the accountant, have you worked that through yet?

Mr HARDWICK — Well, I should clarify: we are not in the business of drilling holes. We are about the technology that can do that. So unless we hit a bit gold nugget at Brukunga, which is unlikely, then we are going to stay in the technology game, but so we are not sort of out there to try and drill a bunch of holes but just to facilitate companies to do so with providing them with the technology that can.

The CHAIR — Another way of promoting the exploration.

Mr HARDWICK — Yes. We need to demonstrate that up at Brukunga, which is what we are trying to do. The financial reward of hitting the halo is a better way of explaining it. We are drilling and there is something around the pods that signifying that it is there and that information allows us to make better decisions about where the next hole goes. So rather than drilling off in the wrong direction, we are drilling in the right direction.

The CHAIR — It is evidence gathering, is not it?

Mr HARDWICK — It is, yes.

Mr NOONAN — That is essentially giving the South Australian Government a competitive advantage over others in terms of greenfields investment.

The CHAIR — How would a government like Victoria get involved in something like that?

Mr HARDWICK — I guess it is a case of identifying the similar province that you want to look at. You cannot sort of drill out the whole state, but being able to target an area and want to look at it in that grid pattern formation, you are just eliminating any doubt because your holes are close enough apart that you are going to know every mineralisation. You are not going to hit deposits all the time. It is not a matter of saying yes I found something every time. It is just to provide data so that explorers can drill it out deeper and firm it up, prove it up, yes.

The CHAIR — Okay.

Mr NOONAN — The application, this application, does it go beyond mineral exploration? Does it have the capacity to do that, such as searching for geothermal energy hotspots or even carbon capture and storage?

Mr HARDWICK — I am probably not qualified to talk on that. Geothermal already deals with very deep holes with the wells that they dig are sort of two to three kilometres. So well, yes, I guess we could reduce their drilling costs. It is very expensive to drill a three kilometre well, but no, that is not really where we are headed. Geothermal is yet to be proven as viable in terms of it is viable to be able to produce heat, but being able to provide energy economically on a scale that is economic is still to be proven. So yes, I do not think we are not in that space. Carbon storage and capture, yes, sorry I cannot comment on that.

Mr NOONAN — That is all right.

The CHAIR — Any other questions?

Mr NOONAN — Look, just a short one. What is your level of collaboration between your senate and the South Australian Centre for Mineral Exploration undercover?

Mr HARDWICK — You are not talking about PIRSA here?

Mr NOONAN — You will have to excuse us because we are from Victoria. It is the one at the University of Adelaide that has been established by PIRSA.

Mr HARDWICK — Okay. Yes. One of our program leaders is at Adelaide University in that department, it is funded by that department I should say, his position. I do not actually know a lot about that particular department, to be honest with you. I can talk about our collaboration with PIRSA which I am much more familiar with.

Mr NOONAN — Probably just briefly.

Mr FOLEY — On that and in doing so, contrast that with the relationship with other state equivalent mineralisations.

Mr HARDWICK — PIRSA are a core participant in our CRC. They are providing researchers approximately three, three and a half FTE equivalent and in-kind value of something like \$600,000 or \$700,000 a year provided along with cash. They put a million dollars into the CRC. So we regularly have interactions with them, yes and they have been particularly supportive. I have not really been here that long, but all of my interactions with them have been very supportive of what we are doing. They give us a lot of exposure in journals or events where we get mentioned a lot which is great.

Mr FOLEY — And contrasting that with other state agencies around the country.

Mr HARDWICK — The other government surveys involved at our CRC are just at an affiliate level. They essentially pay \$10,000 a year to be able to look at what we are doing but they do not have an ownership in the IP created. I have got to say none of the other surveys are particularly active within our CRC. We have Geoscience Australia as well, which is the federal geological survey if you like. They are quite active. They are directly involved in a couple of projects, but the individual state-based surveys we have them along to our conference, we communicate with them but they do not take an active participation in what we are doing.

Mr FOLEY — So possession, that is location, is nine tenths of the support.

Mr HARDWICK — I do not think so. I do not think that being in South Australia means that there has to be that we get all our support from PIRSA. I think we could collaborate with other state-based surveys just as easily. I mean, we are travelling all the time. It is a small country.

Mr FOLEY — I am familiar with a number of other CRCs that are based in Melbourne and around Victoria, and the dairy industry most particularly, and it tends to be a reflection of states playing to their strengths and the federal support that goes with the CRCs following that. From what we picked up from the investment in minerals resource, that ultimately exploration in South Australia would follow that on the same basis.

Mr HARDWICK — Yes. It is just high on the agenda of the South Australian Government I guess. Perth and Brisbane are big mining states. It is just higher on the agendas for R&D and exploration for the State Government. So most of our researchers are not here. Most of them are in Perth or Brisbane. So we have got a conference starting next week and when we get people in that 70 or 80 per cent of people will be coming in from places other than South Australia. It just so happens that the state-based geological survey is our biggest supporter out of the geological surveys.

Mr FOLEY — Can I ask you another question in relation to SAMPEG, the group of leaders who are there to assist the government in the reputational side of promoting the industry, are you familiar with that at all?

Mr HARDWICK — Sorry, I am not. I apologise I am not again.

Mr NOONAN — There is a question here. We have got a couple of questions and one is about if you have got the research and you are improving the research in terms of locating significant mineralisation at depth, do the mining techniques that exist successfully then extract those minerals and obviously then transport them to the surface?

Mr HARDWICK — Absolutely, yes. I think that is what I was trying to demonstrate with that return of investment slide is that their ability to mine at depth is not an issue. They are comfortable doing that and it is profitable doing that.

Mr NOONAN — So it is really about trying to get the advances in technology and efficiency in terms of the search in order to keep up with what is already well developed and is the capacity to get to it.

Mr HARDWICK — Yes. They mine at great depth already. I am talking about where the mineralisation is found. So with Olympic Dam you might have found it 300 or 400 metres from the surface, but you are drilling 1 kilometre to 1.5 after that. So they are mining at depths. Financially it is simply finding it and the barrier has been having enough incentive to drill through that first 500 metres of cover, which is nothing. We are trying to identify what is in that cover that could identify what is beneath, but really you have got to have the incentive to get through that first 500 metres and drill. If it is expensive you will not do it particularly where there is easier finds to be made.

Mr NOONAN — Okay. Good. Thank you.

The CHAIR — Thank you very much. We are very grateful for you taking the time out to come and see us and you have answered all our questions. You will be sent transcript of today's proceedings probably in about two weeks. Feel free to make any alterations that you think appropriate as far as typographical punctuation errors, et cetera, but nothing to the substance of that.

Committee adjourned.