

REPORT OF PROCEEDINGS BEFORE

GENERAL PURPOSE STANDING COMMITTEE No. 5

INQUIRY INTO COAL SEAM GAS

CORRECTED PROOF

Monday 12 December 2011

The Committee met at 9.30 am

PRESENT

The Hon. R. L. Brown (Chair)

The Hon. J. Buckingham
The Hon. R. H. Colless
The Hon. G. J. Donnelly
The Hon. S. MacDonald
The Hon. Dr P. R. Phelps

CHAIR: Welcome to the seventh and final public hearing of the inquiry into coal seam gas, which is examining the environmental, economic and social impacts of coal seam gas activities in New South Wales. I acknowledge the Gadigal people, who are the traditional custodians of this land. I also pay respect to the elders past and present of the Gadigal nation and extend that respect to other Aboriginals present.

At this final hearing officers from the Department of Trade and Investment Regional Infrastructure and Services will be appearing for the second time. The Committee thanks them for returning to assist us with our deliberations. We will also be hearing from a number of other key stakeholders, including the Australian Petroleum Production and Exploration Association, the National Water Commission and the Native Title Services Corporation.

Today's hearing concludes the Committee's evidence gathering. The Committee conducted four regional hearings, three Sydney hearings and three regional site visits. The Committee commenced taking evidence in September and since then it has heard from over 120 witnesses. The Committee would like to thank everyone who participated in the hearings and contributed to this inquiry.

I would like to make some brief comments about the procedures for today's hearing. No media are present so I will not address comments to them. Committee hearings are not intended to provide a forum for people to make adverse reflection about others. The protection afforded to witnesses under parliamentary privilege should not be abused during these hearings. I therefore request that witnesses focus on the issues raised by the inquiry terms of reference and avoid naming individuals. In regard to audience comment, we are aware that people hold strong views about coal seam gas development.

There is a great deal of interest in the issues being examined by the Committee, as shown by the 1,000-plus submissions and form letters sent to the inquiry. The primary purpose of this hearing is to give individual witnesses an opportunity to give their evidence before the Committee. Although this is a public hearing, it is not an open forum for comment from the floor. Only questions from the Committee and the evidence of witnesses are recorded in the transcript. Audience interruptions are not recorded and may make it more difficult for witnesses to fully express their views.

Witnesses are advised that any documents they wish to table should be provided to the members through the Committee staff. If you have any documents to table the Committee staff will take them from you. A full transcript of today's hearing will be prepared by the Hansard reporters and the transcript will be available on the Committee's website in the next few days. I ask everyone to turn off their mobile phones. For the information of the witnesses and the public gallery, two of our committee members have been held up due to the inclement weather in Sydney and flooding. I will proceed with the members we have.

MARK OGGE, Operations Director, Beyond Zero Emissions, affirmed and examined:

CHAIR: Mr Ogge, would you like to make a brief opening statement? If you have an extensive statement perhaps you could table it for the benefit of Hansard.

Mr OGGE: I have a five-minute statement. There is a lot of concern about coal seam gas surrounding issues such as the impact on water resources and agriculture and the effect on communities caused by the industrialisation of a large area of the Australian landscape. On the face of it, unless there were real benefits, coal seam gas would not be mined. It appears to me that there are three justifications for coal seam gas mining raised by the industry. The first and most important are the perceived economic benefits. The second is the assertion by industry that coal seam gas is a necessary form of energy that Australia and the rest of the world needs and the third is that coal seam gas is a source of clean energy—a reference to the idea that it has relatively less emissions than coal. I will address the second two justifications.

In terms of the necessity for mining coal seam gas, it is well established that there are a lot of commercial off-the-shelf renewable energy technologies that can provide energy more reliably than coal seam gas. One of the main ones is solar photovoltaic energy which is reducing in cost and has reduced by 38 per cent this year. Leading world economies such as Germany are heavily involved in installing this form of energy. Germany added about eight gigawatts to the grid last year alone and solar energy is now 10 per cent of its cost from a decade ago. The use of wind energy has increased around the world by about 30 per cent per annum, and the cost of this form of energy is reducing rapidly. Solar thermal power, which has a base load capacity and utilises energy storage, is being rolled out on a large scale in both Spain and the United States with big plans for North Africa and other areas as well. There are a lot of alternative commercially available technologies.

In terms of cost, renewables have been more expensive than fossil fuels in the past but there are two certainties about energy costs: Firstly, that renewable energy costs are coming down rapidly and secondly, that gas costs are going up rapidly, particularly in Australia. In the next few years as all the liquefied natural gas trains will come on line and gas will reach price parity with international gas. It is priced at about \$3 a gigajoule now. In 2008 the international price was around \$12 a gigajoule and Santos is telling investors that it will be linked to the oil price. We will soon start getting the same volatility at the light switch that we currently get at the petrol pump. There is also a risk with gas. Gas processing plants have been known to blow up, such as the Varanus Island plant explosion, which knocked out 30 per cent of Western Australia's power for two months in 2008.

On the issue of whether it is clean or not, the claim of the Australian Petroleum Production Exploration Association is that it has up to 70 per cent less emissions than coal seam gas. That claim refers to a comparison with coal but it picks the absolute theoretical best gas plant you could build and compares it to the absolute worst coal plant you could find in China. In reality, if you are making a serious comparison you should compare an open cycle gas plant, which is where the gas is used in China and Australia, and not a combined cycle gas turbine and you would choose a brand new supercritical plant such as Kogan Creek, which has emission levels similar to an open-cycle gas plant. The actual comparison to coal is a bit misleading because, as the Australian Petroleum Production and Exploration Association noted in a report commissioned from Worley Parsons, gas will not replace any coal plants in China (page 26). It is an additional supply, so it is displacing renewable and nuclear power. In both Australia and overseas the comparison should be made with renewable energy, because that is what it is mostly replacing.

Beyond Zero Emissions has concerns over fugitive emissions because methane is a powerful greenhouse warming gas and the way it is measured is a house of cards. It is measured under Engers in Australia but the fugitive emission section of Engers relies upon the American Petroleum Industry Compendium which is based upon research done by the Gas Research Institute United States Environmental Protection Authority in the 1990s. That has been superseded by research last year. When those measurements were carried out they did not realise what a problem methane was and they have under-estimated the fugitive emissions from different parts of the process, particularly well workovers and well completions and unconventional well workovers were out by a factor of about eight and a half thousand, which is of concern.

If one looks at the international situation, in Wyoming and the Powder River Basin, there are levels of fugitive emissions of around 15 per cent across gas fields. In Australia the big projects in Queensland are assuming .1 per cent, so there is a large discrepancy there. Migratory emissions is another thing I can talk about later but we are concerned about that, so we have commissioned Worley Parsons—the same people who did the

report for the Australian Petroleum Production and Exploration Association—to prepare a report for us, with the scope that we outlined, with the questions that we felt needed to be answered urgently and we have a contract for the delivery of that report. We were notified that the report was completed and going to the legal department in Queensland. At that point we were also notified that the Board had decided that they would not release the report, for reasons unknown. For a month we tried to negotiate the release of the report until we realised that it was not going to be released and we went public and we are demanding the release of that report, as is required under the contract.

Finally, we feel strongly that it is important to get a handle on what the real emissions are from coal seam gas. So Beyond Zero Emissions is procuring laser methane measuring equipment that can measure methane in the atmosphere accurately to the level of parts per billion from about 150 metres away. We are building a dispersion calculation model which we can use as well. We are arranging access with landowners and we are going to get out there and start measuring what the actual fugitive emissions are because we think it is important and we are concerned that it is not being measured properly by Government and industry.

CHAIR: Before we move on, I notice your submission does not give us any information about your organisation. Could you take a couple of minutes to describe what Beyond Zero Emissions is, what you do and how you are funded?

Mr OGGE: Beyond Zero Emissions formed because we felt that there needed to be an emphasis on the solutions to climate and energy security issues. We recruited a bunch of engineers and we do research on the solution side, mostly around renewable energy but we also look at land use, energy efficiency and transport. We employ eight full-time researchers, most of whom are based at the University of Melbourne Energy Research Institute or the Institute for Sustainable Futures. These experts are housed at universities but work on the project, which is a collaboration with the University of Melbourne. A key part of what we do is that we have pro bono contributions from energy professionals across Australia, about 150 engineers who make contributions at different levels to the various research projects we run. We receive funding mostly from small supporters—mums and dads giving \$25 a month, for example—but we do have a number of private individuals who contribute larger amounts.

The Hon. JEREMY BUCKINGHAM: You have prepared a great submission and it is very timely that at this end of the Inquiry we start to look at the fugitive emissions. I think coal seam gas extraction as a clean source of energy is one of the premises of the industry. So my question relates to your submission which points to research suggesting that in some situations fossil fuel gas production and combustion can deliver a greenhouse footprint greater than that of coal. Can you expand on that and talk about any new research that has come out since August when you made your submission?

~Brk/Norris

Mr OGGE: I do not really have to quote new research because the Australian Petroleum Production and Exploration Association's own report cites coal seam gas having up to 70 per cent less emissions than coal. If you take the other end of the spectrum that it chose from, you could comment—with equal accuracy, or possibly more accuracy because of the way that gas actually replaces coal—that gas has up to 45 per cent more emissions than has coal. It just depends on which power plant you compare. It is difficult to say with fugitive emissions because the work basically has not been done, particularly in Australia, with unconventional gas. The only example of proper measuring of fugitive emissions in the field is by the United States Department of Energy in the Powder River Basin, where they found up to 30 per cent of well yield was being lost as fugitive emissions and up to 15 per cent of the total field. Does that answer your question?

The Hon. JEREMY BUCKINGHAM: Yes. Was that high-capacity energy?

Mr OGGE: Yes.

The Hon. JEREMY BUCKINGHAM: Could you explain, for the record, why it is suggested there are more fugitive emissions from unconventional gas as compared with conventional gas? What are some of the issues that lead you to believe that there are more fugitive emissions from unconventional gas?

Mr OGGE: There are more wells. That is part of it. Whereas you have one well out at sea or in the Cooper Basin for conventional gas you can have hundreds of thousands of wells on land. They use hydraulic fracturing for conventional gas as well, but they use it more for unconventional gas. Obviously, when you are injecting waters at high pressures to try to fracture rock you get more fissures. Another issue is that you have to

extract a huge amount of water out of the wells, and with that water comes gas, and particularly at the beginning of the process it is hard to separate the gas from the water so you get more emissions.

Our really big concern about fugitive emissions is with what are called migratory emissions. Imagine vast areas of land with a coal seam that is 500 to 600 metres down. What is actually keeping that gas in the coal seam is water pressure. Water pressure actually holds the gas in. With coal seam gas extraction you pull out all that water, you take the water away, so nothing is capping the gas. The theory is that it then migrates up the wells that the companies drill to use the gas commercially. The problem is that you do not know what other pathways there are for the gas to come up. There are thousands and thousands and thousands of uncharted bore holes and well holes on agricultural land across Australia. Coal seam gas is not very deep. Additionally, 40 per cent of those wells are being fractured; so you are deliberately putting fractures in there.

The geology is not well understood. Industry claims they have what are called aquatards, which are impermeable layers of rock separating the coal seam from the layers above. But there are huge uncertainties around that. We are really worried that we will be drawing up a certain amount of gas through the wells but then will be losing a massive amount of the total amount of methane through fissures and old bore holes and wells across Australia, and that is just not measured. So the work really needs to be done to find out whether that is happening. We just do not know. There is a lot of anecdotal evidence to suggest this, but we just do not know. We just want the work to be done to establish whether or not it is happening.

The Hon. JEREMY BUCKINGHAM: In your submission you suggest the American Petroleum Institute compendium and the Greenhouse Research Institute paper, which are nearly 20 years old, are not sufficient, that we should be doing research that is Australia-specific.

Mr OGGE: Yes.

The Hon. JEREMY BUCKINGHAM: And that is part of the reason you are talking about getting out there on your own to actually assess it. Do you think it is a responsible way for us to be managing this industry that a non-government organisation like yours is doing this work and it does not appear that somebody else is doing the work?

Mr OGGE: We would much rather not do it. It is actually going to cost a hell of a lot of money and be really hard work. So we would much prefer it was done by an independent body that is answerable to government. With reference to the American Petroleum Institute compendium, that document explicitly states it is "neither a standard nor a recommended practice for the development of emissions inventories." So it does not hold itself out to be the gold standard, as it is being called by some in the industry. That is based on work by the Gas Research Institute and the Environment Protection Authority, and the Environment Protection Authority, who were the authors of the original work, said the Environment Protection Authority and Gas Research Institute study was the best available data and somewhat restricted knowledge of industry practices at the time provide estimates of emissions from each source of various segments of the natural gas industry. In addition, the study was conducted at a time when methane emissions were not of significant concern in the discussion about greenhouse gas emissions. Over the years new data and increased knowledge of industry operations and practices have highlighted the fact that emissions estimates from the study are outdated and potentially understated for some emission sources.

That is from the authors of the report. So it is something of a house of cards. I think we need to go back and do the work, and do some properly designed scientific studies, which will include measuring, geological surveys, et cetera, and find out what is going on. Apart from anything else, with that uncertainty, the carbon liabilities for people investing in this industry have a big question mark over them. I can table, if the Committee likes, a Merrill Lynch note to investors, pointing out that that was actually a serious level of uncertainty for investors.

The Hon. JEREMY BUCKINGHAM: So the fugitive emissions will attract the carbon price?

Mr OGGE: Yes.

The Hon. JEREMY BUCKINGHAM: Therefore, that could be a real disincentive for people to invest and so potentially could affect the profitability of these industries?

Mr OGGE: Yes. Gas that is burnt overseas is not included; there is no carbon price on gas that is burnt overseas. But all emissions produced in Australia are liable to the carbon price, and fugitive emissions are part of that. Of course, they have a greenhouse gas equivalent; so, tonne for tonne, it is laid out by the Intergovernmental Panel on Climate Change, that methane when measured over a 100-year period has 21 times the warming potential of carbon dioxide, so you pay an equivalent price.

The Hon. JEREMY BUCKINGHAM: Of 21 times more?

Mr OGGE: Yes, tonne for tonne. So they are assuming what are in my view ridiculously low numbers, 0.1 per cent losses. I find it hard to imagine that in five years time those numbers will be accepted. And if investors are making their investment decisions on the basis of those numbers, I think they are taking a risk.

The Hon. JEREMY BUCKINGHAM: Could you expand on some of the alternatives? It has been often put to this inquiry that there is no real alternative to peaking or base load power generation. What are some of the off-the-shelf alternatives that are viable? Also, what is the opportunity cost? Is there an opportunity cost? If we go with coal seam gas, does that mean we may not see investment in renewables?

Mr OGGE: Absolutely. The fight in the market, if you like, is between gas and renewable energy. So if we build a whole bunch of gas plants across Australia now, and likewise round the world, you will have gas plants running for the next 60 years, rather than renewable energy, and you will be subject to the gas price fluctuations that that involves. In terms of off-the-shelf technologies, I think the first point to make is that there is no urgency to start building new power generating assets in New South Wales because power demand is going down at the moment, as it has been for the past few years and is projected to continue. So we do not have to rush out and build a whole bunch of power plants.

The main commercial off-the-shelf technologies are wind, solar photovoltaic and also solar thermal and hydro. Solar thermal and hydro are dispatchable power, and electricity is therefore able to be dispatched as needed. That is what is called therming power. Solar thermal is almost entirely the same as a coal plant, in that all the steam set and generation are exactly the same, but rather than having a coalmine you have mirrors that concentrate the sun's energy onto a receiver, and that produces heat. That heat can then be flashed to steam and drives a conventional coal-style turbine.

The thing about that is that, because it is producing heat rather than electricity directly, you can actually store that heat. The way to do that is to use a working fluid of molten salts—so, a mixture of potassium and sodium nitrates—and run that through the receiver, and that fluid is heated to about 600 degrees. That salt is then stored in a large, highly-insulated tank, and as you need heat during the middle of the night you dispatch some of that heat to a heat exchange and that creates steam and drives a generator and produces electricity and sends it out to grid. So you can have renewable solar energy 24 hours a day. It is essentially a base load form of power, or a dispatchable form of power.

The Hon. JEREMY BUCKINGHAM: Are there operating examples of that technology?

Mr OGGE: Spain at the moment has 50 solar thermal power plants either in operation or under construction and to be finished by 2013.

The Hon. JEREMY BUCKINGHAM: How many megawatts of power would they be producing?

Mr OGGE: They are all 50-megawatt plants, because Spain has a limit on its feeding tariff. I think there are about 10 operational plants with molten salt storage at the moment, and for the most part they are parallel trough plants, with about eight hours of molten salt storage. So they can operate flat out eight hours into the night. There are also a bunch being built in the United States.

CHAIR: You may just have solved the gas companies' problems of what to do with all those thousands of tonnes of salt!

The Hon. Dr PETER PHELPS: In relation to fugitive emissions, considering that fugitive emissions in this case are of a monetary benefit to the coal seam gas companies, why would not those companies be doing their utmost to minimise fugitive emissions, because every molecule of methane lost is less money to them? Why do you believe that they would not be doing all they can to minimise those fugitive emissions?

Mr OGGE: A certain percentage of emissions just cannot be captured. In particular, there is some venting, but also migratory emissions. And with well completions and well workovers, they just do not know how to capture them. I am sure in most circumstances they do try to minimise the fugitive emissions, but there is also the equation that it costs a lot of money to change the equipment and practices you are using in order to do so. I guess that to some extent they make a judgement on whether the investment they would have to make in capturing those emissions justifies their reduced carbon liability. The other thing to remember is that when the fugitives are not being measured properly in the first place or would appear not to be measured properly in the first place then that is a situation that leads to laxity in terms of trying to capture those fugitives.

The Hon. Dr PETER PHELPS: In relation to pathways, when you dewater a coal seam to release the gas—I am just a humble historian—my understanding is that if you have a high-pressure gas system and you offer a low-pressure exit and a high-pressure exit the gas is more likely to migrate up the low-pressure exit, is it not?

Mr OGGE: I would have to speak to my technical people about that to understand the technical side. I am happy to get back to you on that.

The Hon. Dr PETER PHELPS: Given the choice between migrating up, I am not sure why you say that a low-pressure height would be less attractive for the gas to migrate to than a high-pressure fracture in the existing strata above the rock.

Mr OGGE: Yes.

The Hon. Dr PETER PHELPS: Could you take that on notice?

Mr OGGE: Yes. I am going on advice from people in the industry who have told me that migratory emissions are a problem and anecdotal evidence like at Gloucester recently when apparently they opened up a well that blew the plugs out of a bunch of bore holes down the road. So there is anecdotal evidence, but also people in the industry are concerned about it. I am not really across the geology enough and I am happy to get back to you with more details.

The Hon. Dr PETER PHELPS: Do you have comparative figures on the cost per kilowatt hour for producing renewables and for conventional electricity production?

Mr OGGE: Yes. There is a bunch of uncertainty around this. I will table both of these documents. At the moment the levelised cost of wind is a bit over \$100 a megawatt hour.

The Hon. Dr PETER PHELPS: So that is \$1 per kilowatt hour?

Mr OGGE: I am sorry, I always work in megawatt hours.

The Hon. Dr PETER PHELPS: You give me the megawatt hours and I will divide.

Mr OGGE: Gas is probably more around \$60 to \$70 and solar thermal is about three times the cost of gas. Photovoltaic [PV] is just coming down so quickly it is hard to tell at the moment. At the moment it is hard to compare because it is on roofs. You do not compare it with power plants because you do not have the distribution network. There are a whole lot of complexities. But the electricity from renewables is coming down really rapidly due to economies of scale and learning all over the world and gas prices are getting increasingly volatile and rising. For instance, I have tabled two documents there. One of them is from the BP statistical review of world energy showing the volatility of gas prices. It shows that a few years ago gas went up to \$12 a gigajoule and it is about \$3 a gigajoule now in Australia.

The second one is a slide that Santos showed to their investors saying that 70 per cent of their gas reserves are going to be linked to the global oil price. That is a bit of a scary thought because what they are saying there is that all their gas reserves will be linked to the global oil price and the 30 per cent that is not is legacy domestic gas contracts. All new gas contracts are going to be linked to the global oil price. So you are going to get volatility and potentially extremely steep rises. I am saying it in a roundabout way. I am just trying to point to the uncertainties.

The Hon. Dr PETER PHELPS: Do you know what the coal cost per megawatt hour is?

Mr OGGE: Coal is about \$45.

The Hon. Dr PETER PHELPS: On that level it would be about \$600 per megawatt hour for photovoltaic?

Mr OGGE: That is if you are comparing—

The Hon. Dr PETER PHELPS: The solar industry told us that they needed the 60¢ per kilowatt hour feed-in tariff to be economically viable. On that basis—unless the solar industry was telling us lies—that is about \$600 per megawatt hour, which is an awfully expensive form of energy, is it not?

Mr OGGE: Solar PV is actually reaching grid parity at the moment in parts of New South Wales and around the world. It is more expensive but those figures are misleading because you are comparing the retail price with the wholesale price.

The Hon. Dr PETER PHELPS: No, that is the wholesale price. The 60¢ per kilowatt hour is the feed-in tariff in New South Wales for electricity, which we were told was necessary to keep the industry viable—unless the solar industry has been lying to us, and it may be possible that is the case. But from these figures we have \$600 for photovoltaic, \$180 for solar, \$100 for wind, \$60 for gas and \$45 for coal. How is Australia supposed to maintain a competitive advantage in cheap energy for its productive industries, retailers and mums and dads if we have to pay multiple times what we are currently paying for electricity?

Mr OGGE: I am going to have to look at those figures you have because I cannot work it out off the top of my head. I have to look at the figures you are putting forward and get back to you on that. The fact is that solar PV is hitting grid parity in New South Wales at the moment and coming down rapidly in cost. It is getting cheaper and it is pretty close to getting to the point of being cheaper than getting power off the grid. The other thing to remember about solar PV is a thing called merit order effect. Basically in the electricity market you have a bunch of high-cost events through the year where power companies make a large part of their money. So you will end up getting people sell their electricity into the market for \$12,000 a megawatt hour and numbers like that.

When you put a whole bunch of PV into the market you have less of those events because they correlate to a large degree with peak times. So you end up having a lot less of those events and when you have them the price is less. What that actually does is it reduces the cost of providing energy across the board. So the more PV in the system the less consumers across the board end up paying for their electricity. It actually reduces energy costs to consumers.

The Hon. Dr PETER PHELPS: I presume that Beyond Zero Emissions is opposed to all burning energy power sources?

Mr OGGE: What we would like to see is a shift away from burning fossil fuels to using renewable energy.

The Hon. Dr PETER PHELPS: Why not nuclear?

Mr OGGE: We have looked at nuclear. The thing with nuclear is there are two reasons. One is the time lines. It takes 10 to 16 years to get a nuclear plant from planning to operation whereas with a wind turbine or a solar thermal power plant it is two to five years. So the time lines are just massive.

The Hon. Dr PETER PHELPS: And there is a massive disparity between what can be produced by a single nuclear power station and a single solar thermal plant, is there not?

Mr OGGE: In what sense?

The Hon. Dr PETER PHELPS: A single nuclear power station produces far more electricity at a far cheaper rate than a single solar thermal plant. I suppose it depends on the size of the solar plant.

Mr OGGE: It depends on the size of the plant. There are gigawatt-scale solar thermal plants being built in the United States at the moment. Nuclear plants have been built at a larger scale. Solar thermal plants are basically, as I was saying, the same as coal plants. It is all the same except you are using mirrors to create your heat. You generally build them in smaller modules. A coal plant usually has modules or generators of about 150 to 200 megawatts. It varies. Solar thermal works kind of like that. You will have a series of modules of up to 200 megawatts at the most and you link them together and that is how you get your capacity. That is why they are generally built in smaller units.

The Hon. SCOT MacDONALD: Do you accept what the Government was telling us that wind and solar run at a capacity of about 30 to 40 per cent? I accept your point that the base load is flattening but the peak load is increasing. Do you accept the State Government's viewpoint that as we move into more wind and solar there is actually a perverse outcome that we need more gas-fired power stations because of that 30 to 40 per cent? That is a two-part question. Do you accept the capacity of 30 to 40 per cent? Do you accept that perverse outcome—not in my view but in some people's view—that you need more gas-fired power stations to provide that peak load?

Mr OGGE: No, because the idea that renewables need gas backup is very outdated. That is why solar thermal power is so important. Because you have the energy storage you fill in the variability, if you like, that you have with wind and solar PV. Solar thermal power can work like a base load plant. You can put enough storage on to just keep going 24 hours a day or it can work like a gas peaker. So you have the despatchability. When you build a solar thermal power plant, the key to building it is to having molten salt storage and then you do not need your gas backup at all. It integrates beautifully with wind. If you look at electricity coming in and out of the grid from wind it would vary as the wind comes in and out. You fill the valleys by despatching the heat from the molten salt tanks.

The Hon. RICK COLLESS: I go back to how your organisation is funded. You mentioned you had a lot of family \$25-a-month-type funders.

Mr OGGE: Yes.

The Hon. RICK COLLESS: I think you said you had eight full-time researchers?

Mr OGGE: Yes.

The Hon. RICK COLLESS: They are on the payroll, I presume?

Mr OGGE: Yes.

The Hon. RICK COLLESS: That is a cost of probably in excess of \$1 million a year for wages?

Mr OGGE: Yes.

The Hon. RICK COLLESS: You must have a lot of \$25-a-month contributors. Do you receive any major funding? If so, who are those major funders?

Mr OGGE: We do have some major philanthropic funders as well who donate a percentage of that. It is not appropriate for me to discuss who they are.

The Hon. RICK COLLESS: Do you have any corporate funders?

Mr OGGE: No.

The Hon. RICK COLLESS: Of your major philanthropic funders, what proportion of your funding would come from them?

Mr OGGE: I do not have those numbers on hand. I do not think it is necessarily appropriate for me to discuss that publicly in any case.

The Hon. RICK COLLESS: I am not asking you to give us the names of the people. I am wondering what percentage—

Mr OGGE: The breakdown. I would have to speak to my people—

The Hon. RICK COLLESS: Would you take that on notice?

Mr OGGE: Yes.

The Hon. RICK COLLESS: In relation to your comments on nuclear power, have you had any discussion in your organisation about fusion or fission power?

Mr OGGE: Not really. Fusion does not exist at this point so we are not really looking at that. We stick very much to commercial off-the-shelf kind of options, so we have not looked into it.

The Hon. RICK COLLESS: On the comments you made on fugitive emissions, the gas that escapes from every open-cut coalmining operation, for example, all the gas that is contained in those coal reserves would escape as fugitive emissions, would it not?

Mr OGGE: Sure, yes.

The Hon. RICK COLLESS: Are they included in the emissions from coalmines?

Mr OGGE: Yes, they are, so when they do life cycle emissions comparisons, say, with the Whaley report, they calculate the estimated emissions from coalmines as part of the life cycle of the coalmines and then they do the same for gas.

The Hon. RICK COLLESS: So in terms of capturing the energy that is stored in coal versus coal seam gas, for example, the emissions that come out of coal would include all of the gas that comes out of the coal plus the carbon dioxide that is released as a result of the burning of the coal.

Mr OGGE: Yes.

The Hon. RICK COLLESS: I am at a bit of a loss to clarify in my mind how you can say that emissions from coal seam gas are so much higher than they are from coal when we think that all the gas that comes out of the coalmine escapes into the atmosphere.

Mr OGGE: I see what you mean. It is because coal seam gas covers such vast areas. Coalmines are getting pretty big these days but they are a fairly small area so you do lose a lot of gas. The thing about coal seam gas is that you will get grids covering a massive amount of area like Queensland gathered up around two million hectares, I think, covered by a coal seam gas grid. So you are tapping into the coal seams and dewatering them and it is taking out what is holding the gas down over a vast area, whereas with coalmines it is much more localised.

The Hon. RICK COLLESS: Where does that methane accumulate in the atmosphere?

Mr OGGE: I am not a climate scientist and I am not sure exactly how it works but it is just the molecules trap more heat than carbon dioxide molecules.

CHAIR: We are out of time, unfortunately. Mr Ogge, thank you for agreeing to appear before the Committee. We appreciate your input. If there are questions on notice I ask that you try to have them returned to us by 30 January.

Mr OGGE: Sure.

(The witness withdrew)

BRAD MULLARD, Executive Director, Mineral Resources and Energy, Department of Trade and Investment, Regional Infrastructure and Services, and

MARK PATERSON, Director General, Department of Trade and Investment, Regional Infrastructure and Services, on former oath, and

MARK ANDREW HARRIS, Acting Director for Water Policy, New South Wales Office of Water, affirmed and examined:

CHAIR: There has been a lot of water under the bridge since you last gave evidence. Given some of the evidence that has been presented and obviously put up on our website, would you like to make an opening statement on the issue?

Mr PATERSON: No.

The Hon. Dr PETER PHELPS: Mr Harris, welcome to the Committee. As a water expert, presumably you keep abreast of matters in relation to aquifers not only in New South Wales but around Australia. Are you aware of any instance where coal seam gas water has cross-contaminated through drilling operations with groundwater aquifers?

Mr HARRIS: I am not aware of any instance in New South Wales.

The Hon. SCOT MacDONALD: I am not sure who can answer this question but I did ask it before but I keep getting contradictory evidence. Wind and solar power, we were told the capacity was about 30 per cent to 40 per cent. I think it might have been Mr Paterson who told me that last time. Is that correct?

Mr PATERSON: No. I did not give evidence.

The Hon. SCOT MacDONALD: Is that a figure that the table there is comfortable with, that 30 per cent to 40 per cent capacity wind solar?

Mr PATERSON: I do not know the context in which you are raising the question so I cannot respond; nor do I have with me people focused on energy policy issues. We came here in relation to mining and water policy issues, but I am happy to try to elaborate on questions in relation to broader energy policy issues if you can be more explicit on the basis of the evidence that may have been put before you.

The Hon. SCOT MacDONALD: What I am trying to get to is as we increase our solar and wind generation I am told by a few sources that it runs at about 30 per cent to 40 per cent capacity and therefore as we increase our wind and solar we actually have the perverse outcome where we need more gas-fired power stations to cope with the peak load. I guess that is what I am getting to.

Mr PATERSON: Certainly there is no question that both wind and solar are intermittent sources of generation and in the absence of back-up or support generating systems then if you relied solely on the intermittent generation of wind and solar you could well face brownouts or blackouts. So it is argued that you need something in the ball park of 80 per cent capacity in reserve to be able to cater for the fluctuations in wind and solar. I have certainly read at different points in time that wind operates in the sweet spot, that is, the best, most reliable form of generation about 10 per cent of the time. It is highly variable at other times and often at times of peak load when it is hottest, when it is coldest, it gets really hot or really cold because you have no wind. So you need back-up forms of base load generating capacity to be able to underpin wind and solar.

The Hon. SCOT MacDONALD: We were told again I think as late as Friday when we were with the AGL people in Mittagong that if we do not develop our indigenous supplies, our local New South Wales supplies, we will be reliant on gas from Victoria or Queensland. Can you give me an opinion on what difference in cost we will have to consumers and industry from a greater reliance on non-New South Wales gas?

Mr PATERSON: There are two issues there. Firstly—I think I gave this evidence on the last occasion—we produce 6 per cent only of the gas that is used in New South Wales. So we are reliant on imported gas from other States for 94 per cent of our gas demand at the present time. There are one million households and businesses on reticulated gas at the present time and they are very much dependent on those two external

supply sources that I think I mentioned on the last occasion, the dominant sources from the Moomba gas field in South Australia and about 20 per cent to 25 per cent of our gas comes from Victoria. Both of those sources are not unlimited supply sources; nor are they guaranteed to remain at existing price levels. So unless indigenous sources of gas are identified then significant pressure both in availability and price could come on from our key external sources.

The Hon. SCOT MacDONALD: My last question gets back to the Senate inquiry and what I think Mr Windsor thinks is coming down the pipeline in the Federal Government next year with this \$150 million expert panel. In my view, reading that—and tell me if I am wrong—New South Wales will still continue to be the planning and consent authority for coal seam gas development.

Mr PATERSON: We do not know all of the detail of what has been announced at the national level but certainly it appears to be a duplication of effort and an additional overlay in mechanisms, but without question the consent authority in relation to this remains planning in New South Wales. I do not know what head of power the Commonwealth proposes to use to underpin its interference in these mechanisms. There is already a duplicated approval mechanism under the Environment Protection and Biodiversity Conservation Act at a national level. I am not sure what power they intend to use to underpin this new piece of process.

The Hon. SCOT MacDONALD: So you do see extra costs for industry and consumers?

Mr PATERSON: It is an additional process that will be imposed on development if they proceed with it, and if there is an additional process that will come at a cost and invariably at least to the extent that it is capable in competitive markets people will seek to pass on price increases that they experience to their customers.

The Hon. Dr PETER PHELPS: Given your long professional experience in this area, will you be able to outline your view of what the situation would be for manufacturing in New South Wales if it had to live under a system where the wholesale price of electricity was between twice and four times what it currently is?

Mr PATERSON: I can express a view but I cannot say what the future might hold. Energy varies as a component cost of manufacturing, depending on the nature of the manufacturing business. So there is not a standard manufacturing business in terms of electricity demand or energy demand more generally. In some businesses it is a relatively minor component of their business; in others it is a very substantial component. If you talk about the manufacture of aluminium, then that is—

The Hon. Dr PETER PHELPS: Or concrete.

Mr PATERSON: —that is packaged electricity. Concrete are very high users of energy. So in a competitive international marketplace if the price of energy for those companies goes up and they are a price taker that can threaten the viability of individual businesses or sectors.

The Hon. Dr PETER PHELPS: Effectively what you would see is a capital flight out of this State, possibly out of Australia, for those energy-intensive industries.

Mr PATERSON: There is no question that energy-intensive industries are subject to international competition and in many cases the energy-intensive industries are not price focused subject to high levels of international competition. If energy is a major component in those businesses, which it is, then significant increases in price here can challenge the viability of those businesses.

The Hon. Dr PETER PHELPS: My final question relates to the petroleum Act. We have heard from a number of companies now, all of which have said that the arbitration provisions in relation to exploratory access agreements have not needed to be used for them to obtain what they consider to be appropriate exploratory sites. I would like to get your view on whether you believe there would be any detrimental effects if the Act were to be amended so as to allow, effectively, landowners the ability to refuse an exploratory access agreement.

Mr PATERSON: Certainly to change existing arrangements to give a right of veto over the Crown's assets would have potentially significant ramifications. The resources are owned and held in the name of the Crown; they are not owned and held by the landowners. They have a surface right in relation to the land; they do not own or control the Crown's assets that sit below that land. Granting a right of veto to anybody other than the Crown over the Crown's assets would have significant ramifications.

The Hon. Dr PETER PHELPS: Effectively on cultivated land they in fact do have a right to veto production because they can refuse to enter into an access agreement for production.

Mr PATERSON: They do not have a right of veto in either circumstance. Mr Mullard can take you through the detail of both of those circumstances, but they do not have a right of veto in either environment.

Mr MULLARD: You asked specifically about detrimental effects. A lot of people misunderstand what exploration is about. It is actually about two aspects. One is about assessing the resource. Just as importantly, if not more importantly, it is about assessing environmental impacts. Exploration licences generally in virtually all cases that I am aware of cover a much larger area than what actually ends up being a production zone. So what you actually end up with if you suddenly say certain land is quarantined from exploration is an inability to actually assess the issues that you are actually concerned about, which is what is the impact of extraction of gas on the hydrology.

It is not just about where you are drilling wells for production. You actually need to look at the broader geology and an understanding of the broader hydrology of the region. So if you cannot undertake exploration within this broader zone you potentially are having a detrimental impact in not being able to assess the full environmental impacts.

The Hon. Dr PETER PHELPS: With respect, what we have been told by every company that has appeared before us is that not only have they not had to go to the Land and Environment Court, they have not even had to go to arbitration. There are clearly enough people out there who are willing to enter into voluntary agreements for access that it would seem to be quite a limited change were that refusal of access to be granted at first instance, considering the number of people who we have been told are very happy to have CSG exploration on their property.

Mr MULLARD: You need to understand at the moment we are still at the very early stages of exploration. There have not been a lot of wells drilled in New South Wales and while companies—

The Hon. Dr PETER PHELPS: Metgasco has got 300 access agreements for its exploratory work, all of them voluntarily entered into.

Mr MULLARD: And most landholders are happy to enter voluntary agreements.

The Hon. Dr PETER PHELPS: Why not allow that—

Mr PATERSON: Mr Chairman, can we have a question and answer here?

CHAIR: Yes, members should allow the witnesses to give their answer unimpeded. Please proceed, Mr Mullard.

Mr MULLARD: Thank you. What I am explaining is at the moment most companies are able to get access agreements when landholders reach an appropriate agreement. But you could certainly imagine a situation where it is essential to gain information on the hydrology and geology in a critical area, particularly if there is significant landholding that you actually do need to get an understanding of where access would be required. Those provisions are there to provide that ability.

In addition, for production purposes you do not necessarily need to access the surface land. Currently production can take place and in fact we are seeing more and more production taking place from horizontal drilling. So you might drill on a particular land, you can actually enter the coal seams horizontally and drill for several kilometres without requiring landholder access. Exploration still might be required in order to assess the broader implications of extraction of gas from coal seams in order to understand the overall impacts.

Mr PATERSON: It would also be a highly risky extrapolation to say because in the limited experience that we have had in relation to coal seam gas exploration and agreements being entered into in those circumstances that giving a right of veto would not change the circumstances. That would be a highly risky extrapolation and I would urge the Committee not to go down that path. Clearly there are not rights of veto at the present time because if people do not reach agreement there are mechanisms to facilitate that. Obviously the

majority of companies and in the majority of circumstances agreements are reached. That is a highly desirable outcome.

The Hon. Dr PETER PHELPS: It is not merely the majority; it is 100 per cent so far.

Mr PATERSON: That shows that people are prepared to sit down and sensibly engage with landowners. That does not mean to say that because you have got a willingness to do that at the present time you could move to a veto over what I said earlier were the Crown's assets. These are not the landowners' assets that they would be denying access to; they are the Crown's assets.

The Hon. RICK COLLESS: When you say that exploration licences generally cover a much greater area than what the production licence will ultimately pursue, as these explorations licences are due for renewal are the geographical boundaries and the conditions attached to those licences reviewed and are they changed sometimes?

Mr MULLARD: Yes, they are. There is requirement under the Act for a reduction of up to 25 per cent on renewal and companies do relinquish areas and we do update the conditions as required.

The Hon. RICK COLLESS: Of the petroleum exploration licences that are current in New South Wales, have any of them been renewed yet and how many of them are due for renewal in the next 12 months?

Mr MULLARD: I can answer the question about how many have been renewed. There have not been any renewed since March, since the change of Government.

The Hon. RICK COLLESS: Have any fallen due in that time?

Mr MULLARD: Yes, they have. But in answer to the question about how many will become due, I would have to take that on notice.

The Hon. RICK COLLESS: Those that have become due but have not been renewed, are the companies permitted to continue their operations under the old conditions pending renewal?

Mr MULLARD: The titles remain in force until a determination is made on the renewal, so companies can continue to conduct exploration activities.

The Hon. RICK COLLESS: What would be the normal time frame for that renewal process to occur?

Mr MULLARD: The normal time frame for renewal is around three months. There is referencing to other government agencies, particularly around the conditions of title and so on.

The Hon. RICK COLLESS: Why have those issued not been addressed since March? What has been the constraint?

Mr PATERSON: As you are aware, the Government is actively considering strategic land use policy, aquifer interference policies and the development of agricultural impact statements and has imposed a moratorium in relation to fracking and has banned the use of some chemicals in that process. So the Government is actively considering the policy framework that will operate around these areas. I think that heavily influences its consideration about whether it is going to renew exploration permits or production permits in that environment where there are so many active considerations going in relation to the policies that influence it.

The Hon. RICK COLLESS: Mr Harris, I have a couple of specific questions about your industry. Can you tell us how many hydrogeologists are employed by the Office of Water?

Mr HARRIS: I cannot tell you accurately but I believe it is in the order of about 20.

The Hon. RICK COLLESS: Do they interact on a regular basis with hydrogeologists from the industry?

Mr HARRIS: Yes, as far as I am aware they do. I believe they are also members of a number of professional associations, they interact through that, through committee work and through assessments that are done by proponents, on behalf proponents they will review that and talk to those other experts as well, yes.

The Hon. RICK COLLESS: Is it fair to say that the hydrogeology industry in total in Australia is a relatively small industry with a small number of people?

Mr HARRIS: Absolutely correct. They are quite a small group.

The Hon. RICK COLLESS: Anybody that is a hydrogeologist would know other hydrogeologists in the industry probably nationwide?

Mr HARRIS: I think that is an accurate comment, yes.

The Hon. RICK COLLESS: It would be fair to say, would it not, that there would be a great deal of contact between them on a regular personal basis as well as their professional association?

Mr HARRIS: I believe so, yes.

The Hon. RICK COLLESS: Can I ask you a couple of specific questions about the Wingecarribee area. We took evidence from a number of people in Mittagong on Friday. Can you tell us in general terms about the depths of the aquifers in that Wingecarribee area?

Mr HARRIS: No, sorry, I do not have that level of knowledge in that area.

The Hon. RICK COLLESS: Would you be able to take that on notice and give some information, as I say, in general terms. Obviously we do not want specific information about every aquifer. They gave evidence to us that the aquifers in that area are relatively shallow and are sitting virtually right on top of the coal seams. That is the information that I am particularly interested in. This may be a question for Mr Mullard. The Camden gas field is the only operating production lease in New South Wales. I think that has been approved for about ten years. Is that correct?

Mr MULLARD: In that order. I would have to get precise dates but it has been operating for quite a few years, yes.

The Hon. RICK COLLESS: You obviously would have heard all the concerns that have been expressed by a number of different organisations about the potential deleterious ramifications of the coal seam gas industry generally. Have any of those concerns that have been expressed manifested themselves in the Camden gas field?

Mr MULLARD: I am not aware of any issue. The main issue generally stems around water and water contamination and then disposal of water. The experience in the Camden area is certainly the geology is such that the aquifers are isolated from the coal seam production and we have seen no cross-contamination of aquifers. In terms of water disposal, the water production out of the Camden gas field has been substantially less and is in volumes that are very easily manageable.

The Hon. RICK COLLESS: What is the quality of that water? Maybe Mr Harris would have some more information on that.

Mr HARRIS: No, sorry, not on the quality. I understand the quantity is about five megalitres per year.

The Hon. RICK COLLESS: Would you or your department have access to the water quality figures?

Mr HARRIS: I can certainly find that out for you, yes.

The Hon. Dr PETER PHELPS: Do you have pre-existing historical data for agricultural bores around the Camden area?

Mr HARRIS: I am not aware.

The Hon. Dr PETER PHELPS: Can you take that on notice?

Mr HARRIS: Certainly.

The Hon. JEREMY BUCKINGHAM: Mr Harris, last week the media reported that water samples taken by environment groups suggested possible pollution of waterways by Eastern Star Gas and Santos operations near Bohena Creek in the Pilliga. What surface water monitoring has your department done in the last 12 months in relation to coal seam gas exploration projects?

Mr HARRIS: I am not aware of any monitoring particularly in relation to coal seam gas projects in that area.

The Hon. JEREMY BUCKINGHAM: We have just heard from Mr Mullard that as far as he is aware there has been no cross-contamination of water around the Camden AGL coal seam gas operations. What monitoring does your department do in that area for potential cross-contamination?

Mr HARRIS: Again I would have to take that on notice and consult with the local experts.

The Hon. JEREMY BUCKINGHAM: It is often suggested that there is dissimilar geology and processes between the Australian coal seam gas or unconventional gas industry and that which we see in the United States. The fact is that there are two distinct geologies over there. One is the shale gas and the other is the coal bed methane which has more in common with the Australian situation. Are you aware of the report from the United States Environmental Protection Agency released this week that suggests that there has been contamination of a drinking water aquifer from what they call coal bed methane operations?

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

The Hon. JEREMY BUCKINGHAM: That is a question to all of you. Are you aware of that report and do you think it has any implications for the industry in New South Wales?

Mr MULLARD: I am aware of the report. It was an interim report under the United States Environmental Protection Agency. It is still an interim report. I understand there is quite a lot of dispute about the interpretation of whether or not there has been cross-contamination. At the moment it is part of their interim report and people are waiting to see what the outcome of the final report is.

The Hon. JEREMY BUCKINGHAM: You said that it is disputed.

Mr MULLARD: I am saying there are certainly sections in the United States that have—not disputed, but are not necessarily agreeing with the interpretation that there is cross-contamination. Cross-contamination can occur from a variety of sources and it is a matter of whether or not what has been reported by the EPA as part of its interim announcement—people are waiting to see the final report to see how that conclusion was derived.

The Hon. JEREMY BUCKINGHAM: Who are the people who are contesting that United States Environmental Protection Agency?

Mr MULLARD: Certainly some of the industry in the United States is contesting it.

The Hon. JEREMY BUCKINGHAM: Has the Office of Water had any discussions with coal seam gas companies in relation to the draft Murray-Darling Basin Plan and the allocation of 300 gigalitres of water within the Oxley-Gunnedah Basin?

Mr HARRIS: No, I do not believe so. I am certainly not aware of it.

The Hon. JEREMY BUCKINGHAM: Could you take that on notice and table any correspondence between the Office of Water and coal seam gas companies?

Mr HARRIS: Certainly.

The Hon. JEREMY BUCKINGHAM: My question is to Mr Mullard. The Government announced an extension to the fracking moratorium. Could you provide the details of the review including the terms of reference for the review, who is undertaking the review, the resources available to undertake the review, and a copy of the document, email or letter requesting the review be undertaken?

Mr MULLARD: I do not have those with me. I will certainly take that on notice. You are talking about the extension of the review; the Chief Scientist is undertaking a review of fracking and well integrity standards. There is a process underway and we have extended the fracking [moratorium] to enable that process to go through.

The Hon. JEREMY BUCKINGHAM: Are there fracking standards in New South Wales?

Mr MULLARD: There are fracking standards but they relate to United States standards. There is a review of all standards, nationally and globally, that apply. Currently the standards that apply are US standards for fracking.

The Hon. JEREMY BUCKINGHAM: Do they apply to coal bed methane or shale? Were they designed for the Powder River Basin or the Marcellus shale?

Mr MULLARD: They were designed for undertaking fracking operations for both shale and coal seam methane.

The Hon. JEREMY BUCKINGHAM: Does the fracking moratorium apply to exploration and production activities that have already been approved or is it only in relation to new projects?

Mr MULLARD: It is only in relation to new approvals, so basically there is a ban on new fracking approvals. Having said that, no fracking operations have been undertaken by companies since the ban came into place.

The Hon. JEREMY BUCKINGHAM: How have you determined that?

Mr MULLARD: We have contacted the companies and they have advised us they have not undertaken fracking.

The Hon. JEREMY BUCKINGHAM: I am not sure whether the Government or the department keeps this information on hand but could you provide the Committee with a list of all coal seam gas wells that have been fracked in New South Wales including the company undertaking the activities, the well location, date of fracking and the volume of chemicals used?

Mr MULLARD: I would have to take that on notice.

The Hon. JEREMY BUCKINGHAM: Does the Government keep an inventory of all the wells that have been fracked?

Mr MULLARD: We keep a record of all wells and the reports of the drilling operations—what was actually undertaken on those wells.

Mr PATERSON: On that question on notice, I am conscious that at the end of this you will ask us to respond within a given time. Some of these questions will require quite a bit of manual manipulation. They are not things that would sit comfortably that we can draw down quickly. I record for *Hansard* that we may not be able to respond to some of these technical questions within the time frame.

CHAIR: In that case could you advise us in the first instance what time frame you would need to assemble all those pieces of data into a cogent form and if it looks like it will be too big a task we may withdraw the request. If it can be done within, say, 60 days, we may still be able to use the data.

Mr PATERSON: We will reflect on the questions once we have seen the record but I am conscious that some of them will require quite a degree of manual manipulation. It is not something we can push the button on.

The Hon. JEREMY BUCKINGHAM: I understand. Mr Mullard, do you accept that the exploration phase of coal seam gas is very similar to the production phase?

Mr MULLARD: No, I do not accept that. Exploration is quite different from production. With production you are producing; effectively you are draining water from the well and producing gas. You may have undertaken stimulation-type activities such as fracking or horizontal well drilling. Most exploration wells are drilled for a very temporary period of time. They are drilled to obtain core and rock samples and recover the coal. The coal is normally placed in canisters to desorb the gas from the coal so you understand how much gas is contained within the coal and the quantity of gas that comes from the coal. The wells are only temporary and they are then completely backfilled with cement and sealed.

The Hon. JEREMY BUCKINGHAM: But there are significant numbers of pilot production wells that are fracked, dewatered and horizontally drilled, and that occurs under an exploration licence.

Mr MULLARD: Yes, there is pilot production, which is again under exploration, but again they are quite limited. Under the planning approvals process you can only drill five of those production wells in any particular area, otherwise you need to go through the full planning approvals process.

The Hon. JEREMY BUCKINGHAM: Why are there five?

Mr MULLARD: Normally five are drilled because that is the way you test whether an area can produce gas. Quite often in the industry they will drill what they call a five-spot—like the dice. The outside wells isolate the centre well from the hydrology within the coal seam so the outside wells generally produce water and the inside well produces the gas.

The Hon. JEREMY BUCKINGHAM: Do you have a concern about exploration, given that you are saying that you need to do exploration to assess environmental impact, when the exploration phase could potentially have a significant or similar environmental impact to the production phase, which requires a much higher level of assessment—potentially an environmental assessment or a much broader approval under the Department of Planning? Do you see that as a flaw in the approvals process?

Mr MULLARD: No, because the approvals process is designed specifically to do that. Most exploration consists of core wells across the region, which will identify areas that they may want to target for pilot testing. The reason they are limited to five wells under the Environmental Planning and Assessment Act is to limit any potential impacts. Five wells are a very small pilot project. If you go beyond that you are required to obtain the full environmental assessment. It is recognised that very small test production has minimal environmental impact.

The Hon. JEREMY BUCKINGHAM: How has that been determined? Companies are only required to go through the review of environmental factors [REF] process for pilot production. Broader production would require potentially an environmental assessment [EA] or an environmental impact statement [EIS] and other elements. Are you saying that the REF process is the equivalent of the environmental assessment process?

Mr MULLARD: No, I am not saying that at all. The REF process is specifically designed to determine whether or not you need to go to a fuller assessment. The review of environmental factors is designed to consider the potential risks. One of the tests in that review process is whether a higher order of approval is required.

The Hon. JEREMY BUCKINGHAM: So potentially you need an environmental impact statement?

Mr MULLARD: Potentially an EIS.

The Hon. JEREMY BUCKINGHAM: How many environmental impact statements have been triggered by pilot production in New South Wales?

Mr MULLARD: None that I am aware of; I cannot say definitely. With small-scale production you would not expect that to happen.

The Hon. JEREMY BUCKINGHAM: I refer now to the comments made by Mr Paterson in answer to questions from Dr Phelps. You said it was highly risky to extrapolate the level of access agreements that had

been negotiated so far if you were to consider implementing a right of veto from this point on or in the future, by legislation or regulation. Is that because you believe there is more likelihood of fewer agreements being struck in future? Why do you say it is highly risky to extrapolate from the point we have reached now?

Mr PATERSON: I made the point because those agreements have been entered into under the existing regime and with an immature industry at the early stages. To extrapolate from consent agreements and think there will not be any negative consequences from a right of veto is, I think, a highly risky proposition. A relatively limited number of agreements have been entered into. We are talking about access to assets of the Crown, not a right of veto on access to the assets held by a private operator. If a right of veto was provided it could potentially prevent access to assets of the Crown when they are not held by the person who might have the right of veto. The Crown could decide to have a right of veto, but giving the right of veto to a third party who does not own the asset is, in my view, highly risky.

The Hon. JEREMY BUCKINGHAM: The assumption there is that if the right of veto was given people would be more likely to use it.

Mr PATERSON: I made the point that it was highly risky. I did not extrapolate whether people would or would not use it. I think it is a highly risky extrapolation.

The Hon. JEREMY BUCKINGHAM: Under the Petroleum (Onshore) Act there are arbitration provisions that have not been enacted so far in regard to access agreements in New South Wales. Do you think the cost of arbitration being borne by landholders has contributed to that being the case so far?

Mr PATERSON: Mr Mullard might want to respond to that but from my point of view I think you will find if you look over time that with access agreements, whether for coal seam gas exploration or for other forms of exploration, the dominant outcome is agreement. History would show that the dominant outcome is agreement within the framework which enables a review mechanism if agreement cannot be reached. The dominant outcome in all forms of exploration activity over time has been by agreement.

The Hon. JEREMY BUCKINGHAM: My next question relates to the Government's joint industry task force looking at renewable energy. As set out in the State Plan, there is a 20 per cent target for renewable energy by 2020. I do not know how committed the Government remains to that. As part of that Government task force, is the Government investing base load solar thermal as a potential energy supply source for New South Wales?

Mr PATERSON: You have asked your question about investment by the Government in base load power. I am not aware of the Government making new investments in base load power, in any form.

The Hon. JEREMY BUCKINGHAM: I understood that the joint industry-government taskforce had been tasked—

Mr PATERSON: I am responding to the explicit nature of your question, which was about Government investment. You may want to reframe the question but you asked whether the Government has invested in solar thermal for base load.

The Hon. JEREMY BUCKINGHAM: No, I asked whether or not the joint industry-government taskforce, which has been tasked with developing a renewable energy action plan for New South Wales, was investigating base load solar thermal.

Mr PATERSON: With respect, I think that is a different question to the one I was answering. I am happy to explore in detail whether that task force is examining that particular issue and respond on notice.

The Hon. JEREMY BUCKINGHAM: What is the Government's view on the direction of gas prices for domestic and manufacturing in New South Wales as New South Wales connects to the gas trains and export of liquefied natural gas and we move towards international price parity? What is the expectation of Government as to gas price movements and what is the Government doing to respond to those?

Mr PATERSON: I am not sure that there are any proposals for such a connection so I cannot say that the Government would have a concluded view in relation to what might happen on prices. Clearly, a connection that drew gas from New South Wales to export markets that did not satisfy demand in the domestic market

could well put pressure on pricing. There is no guarantee that existing suppliers of gas, either from Santos or from Victoria, would not have price pressure in any event. So I expect that there will be significant pressure on gas prices in New South Wales, unless indigenous supplies are developed and brought to market in New South Wales.

CHAIR: We will have five minutes of questions from the Government and then a five minute recess for a cup of tea and a comfort break.

The Hon. SCOT MacDONALD: Mr Paterson, a few stakeholders have said that coal seam gas will threaten agricultural production. Have you seen any evidence that the development of this industry will significantly materially impact on agriculture, food production and food security?

Mr PATERSON: No.

The Hon. RICK COLLESS: I want to return to the issue of veto which has been raised by the representatives of many communities. I refer to your earlier answer about the issue of the aquifer interference regulations and agricultural impact statements and so on. If those studies indicated that either aquifers or agricultural production would be deleteriously affected, would those petroleum exploration licences that might be assessed under that process be not renewed or would that issue prevent a production licence being issued?

Mr PATERSON: The Government has not made any announcements on when the aquifer interference policy would apply, whether it would apply in relation to exploration permits or production permits, so I am not in a position to respond to your question.

The Hon. Dr PETER PHELPS: Returning to the issue of access, does not section 71 say that there are no mining operations permitted on land under cultivation except with the agreement of the landowner?

Mr MULLARD: There are constraints to exploration in certain areas.

The Hon. Dr PETER PHELPS: This is for production—section 71 relates to production constraints.

Mr MULLARD: There are constraints for both.

The Hon. Dr PETER PHELPS: In that case, the Government has effectively given a veto over the assets under the ground to that landowner for production purposes.

Mr MULLARD: That is for production but the original questions related to exploration.

The Hon. Dr PETER PHELPS: That is true but my question is, given that there is a significant level of above-ground infrastructure already put in place which is required for exploratory purposes, far more than for coal, antimony, gold or any other exploration, given that you accept under section 71 that no mining operations would be permitted except with the agreement of the landholder, why would you not simply say that no mining exploratory operations should be permitted without the agreement of the landholder?

Mr MULLARD: I think we covered that previously, in terms of the fact that exploration is done for two purposes, one to assess environmental impacts which often, if you have cultivated land that is dependent on irrigation, you may want to know exactly what the situation is in terms of those aquifers.

The Hon. Dr PETER PHELPS: The point is, the argument that was made was that it is not the Government's job to allow veto powers over resources that it owns by virtue of their being below ground. Clearly, in this case the Act envisages a situation where there is a veto over below-ground Government-owned assets.

Mr MULLARD: It only vetoes access in terms of the surface, it does not veto access to those underground resources.

Mr PATERSON: The point is, it does not veto.

The Hon. Dr PETER PHELPS: The key here is that most landholders, I would suggest, are not worried so much about the below-ground access as they are about the above-ground access. The very few who

do have concerns about coal seam gas mining would be more concerned about above-ground access issues than below-ground access issues.

Mr PATERSON: But the questions and answers were in relation to exploration and with respect, I would say they were asked and answered. If you want to change the position in relation to the regime in relation to production, which does require a different set of considerations and does require different standards by proponents and different sorts of considerations by Government, then that is a different set of circumstances. But I would not say that a particular section that you quote is a right of veto in relation to mining or coal seam gas exploration.

CHAIR: I think that issue has been addressed. I will call a brief recess for five minutes.

(Short adjournment)

The Hon. SCOT MacDONALD: Could I address a question to Mr Harris directly, or should it go to Mr Paterson?

CHAIR: You might put the question to Mr Paterson, who will decide who will answer it.

The Hon. SCOT MacDONALD: My questions are on the water. About a week or two weeks ago assertions were made that it would be requested that the draft basin plan be amended to allow, I think it was, 600 gegalitres of water for mining. In other words, the groundwater take was to be, I think, 600 gegalitres of water for mining. Is that correct?

Mr HARRIS: You are referring to the draft Murray-Darling Basin plan?

The Hon. SCOT MacDONALD: Yes.

Mr HARRIS: That was an outcome purely as a result of technical reassessment of available water, not for any particular industry at all.

The Hon. SCOT MacDONALD: So mining was not to have a certain amount of water quarantined for mining, as far as New South Wales was concerned?

Mr HARRIS: I do not believe that was the intent, no.

The Hon. SCOT MacDONALD: I am still trying to get my head around how coal seam gas fits into the water sharing plans. Can you outline that for me? I mean, we have produce water coming out and maybe we have water being re-injected through irrigation or maybe returned to deep aquifers. How does the coal seam gas industry and its water equation fit into the water sharing plans of New South Wales?

Mr HARRIS: The water sharing plans do not treat coal seam gas extraction any differently than they would extraction for agricultural purposes. Coal seam gas extraction is just another extraction of water. So, under the water sharing plans the extraction of the coal seam gas water would be accounted for, like water for any other licence, against the extraction limits in that plan.

The Hon. SCOT MacDONALD: So if coal seam gas companies use water they will have to buy an entitlement and then they will be subject to allocations, or whatever, just like any other user?

Mr HARRIS: They will be no different from any other user. Some of the water sharing plans have what we call unassigned water, so they may not have to buy entitlements.

CHAIR: I ask a question for clarification purposes. Surely the Government does not require a licence to be purchased for the extraction of water that cannot be used as production water, such as highly-saline water that has to be re-injected or shipped offshore or have something else done with it. I thought a licence was necessary only for water that could possibly be used for some purposes, such as agriculture or industry.

Mr HARRIS: No. There is no difference between the quality of the water.

The Hon. Dr PETER PHELPS: A number of people who have given evidence expressed concern about the prospect of exploration and production in water catchment areas, especially water catchment areas that service the Sydney basin. Could you explain why you feel it is okay to engage in that activity in water catchment areas, and what assurances you have that there will not be any cross-contamination with surface water which eventually flows into our catchment areas?

Mr PATERSON: When you say, in framing that question, "why you feel it is okay", how are you framing that question? I have said no such thing.

The Hon. Dr PETER PHELPS: Exploratory licences have been granted for areas that are within water catchment areas for the Sydney basin. One of the concerns raised by opponents of coal seam gas mining is that there can be contamination of surface water within that catchment basin.

Mr PATERSON: I think Mr Mullard has already given evidence that no exploration permits have been granted by this Government. So, if your question is does this Government hold that view, then this Government has not granted any exploration permits. If it is a question about what was the reasoning of the former Government in granting those exploration permits, Mr Mullard can answer the question in relation to the general policy framework in relation to exploration permits, as to why they are granted in the areas in which they are granted, which is a broader question. But if the question was explicitly about this Government, this Government has not.

The Hon. Dr PETER PHELPS: No, it was quite pointedly directed at previous approvals for permits in those areas. Presumably advice would have been tendered as to why the department had no concern about potential contamination.

Mr MULLARD: Perhaps I could explain the process. The granting of exploratory licence by itself is an administrative act. It does not actually involve any activity, and as such there is no actual risk to the environment from purely granting an exploratory licence. The risk that needs to be addressed is the activity of undertaking any drilling or other exploratory activity within a water catchment area, and those activities are assessed on a case-by-case basis.

They are actually assessed by the company having to do a detailed review of the areas in which they are planning to drill the wells, how close they are to various catchment features, including rivers or dams and groundwater. They have to undertake that assessment in terms of the nature of the activity and what they are planning to do. In addition, there may be very specific requirements by the catchment holder, depending which catchment it is in. In the Sydney catchment authority there has to be an agreement with the landholder, in this case the catchment authority holder, and they may also have additional requirements and conditions imposed to ensure, as far as possible, there is no risk to the catchment.

CHAIR: Mr Paterson, in relation to the granting of exploratory licences, does the department in granting exploratory licences take into account, look at or assess the financial strength or otherwise of the applicant? Is that taken into consideration?

Mr MULLARD: Yes, it does. There is a requirement under the Act to consider the financial capability of the applicant.

CHAIR: Primarily, the government's interest in that would be, I would suggest—but I stand to be corrected—that in case anything goes wrong the government would need to be sure that the company is sufficiently substantial to be able to undertake remediation of those sorts of issues. Is that correct?

Mr MULLARD: There are two components to that. There is a component about the financial capability to undertake work and their ability to manage that. But there are also security deposits held. Security deposits are assessed, once again, as part of the approvals process. Once an exploratory licence is granted, there is no activity except very minor activity. But when it comes to drilling wells for petroleum or other activities like that, which are more surface disturbing, there is a security deposit assessed and held for that activity.

CHAIR: Upon what are those security deposits assessed? It is a variable scale, or is it just a one-off figure for everybody?

Mr MULLARD: No, it is variable. It is very specific. Obviously, more extensive activities require higher security deposits.

The Hon. JEREMY BUCKINGHAM: Has this Government approved any coal seam gas activities in the special catchment areas of the Sydney drinking water supply?

Mr MULLARD: I am not aware of any, but I would have to take that on notice. I cannot guarantee that.

The Hon. JEREMY BUCKINGHAM: I am aware that they recently approved the drilling of the apex bore hole and additional bore holes as a modification of the consent. Are you aware of the submission that the catchment authority made on that modification application?

Mr MULLARD: I am personally not aware of it, no.

The Hon. JEREMY BUCKINGHAM: In it they said that they were opposed to the application for modification of consent because the test they were applying, which is written into the statute, was that any activity in that area has to be neutral or beneficial. Is it the Government's position that coal seam gas is neutral or beneficial in our special catchment areas?

Mr PATERSON: I think Mr Mullard has already indicated that he is not aware of the facts of that particular application. So we will take the question on notice.

The Hon. JEREMY BUCKINGHAM: What is the Government's position? Does the Government believe that coal seam gas would be neutral or beneficial in terms of its impact on our drinking water supplies?

CHAIR: That is a policy question that probably should be directed to the Government. I rule the question out of order. If the member wants to rephrase the question, he can go ahead.

The Hon. JEREMY BUCKINGHAM: I thought these were witnesses of government. My next question is that the Government's submission says:

CSG is likely to have lower fugitive emissions intensity as compared to natural gas or LNG. The processing of CSG is simpler and mostly only requires the removal of water.

Is that the Government's position? On what research is that based?

Mr PATERSON: We went through this series of questions on the last occasion, Chair. It was part of the submission that we made, and there was extensive questioning on the last occasion on this very proposition. So I refer back to the transcript in terms of our responses.

The Hon. JEREMY BUCKINGHAM: There certainly were not extensive answers. That lack of clarity remains. Since that time I believe there has been a move away from allowing evaporation ponds in New South Wales, and that involves a large energy cost. Some estimate that between 10 to 15 per cent of the energy of the coal seam gas harvest will be used in reverse osmosis. Is the answer yes or no: Does the Government still believe that coal seam gas is likely to have lower fugitive emissions intensity as compared to natural gas or LNG?

Mr PATERSON: The terms of the submission that we made to the Committee stand. There is no change, and there has been no change since the time we put that submission forward in relation to evaporation ponds. So our submission on the last occasion remains our submission.

The Hon. JEREMY BUCKINGHAM: The issue of how we manage water is fundamental to the viability of this industry. What is the Government doing to potentially regulate or manage, or assist the industry manage, the millions of tonnes of salt or potentially saline water that this industry may produce?

Mr MULLARD: I go back to the status of the industry. The industry is in the very early stage of exploration. So one of the questions that are unknown—and certainly from the New South Wales perspective they are unknown—is: What quantities of water are likely to be produced from coal seam methane? We do not know. What are the quantities of salt or saline water that might need to be disposed of? We do not know. At the moment that information is still being gathered. There is a project underway. Mark Harris might be able to add

additional information on this. There is certainly a research project underway which we also have been involved in with the Office of Water, which is talking to companies and gathering the scientific data that would enable those questions to be answered. We are looking at the sort of information required to gain that understanding.

The Hon. JEREMY BUCKINGHAM: Where are the saline water and salts that are being produced from the reverse osmosis at Wilga Park or the Pilliga development? How are they being dealt with?

Mr MULLARD: They are mostly very small quantities. At the moment they are stored on site. At other places they are taken to treatment facilities where they are treated and disposed of appropriately at appropriately licensed disposal centres. You are looking at very, very small quantities.

CHAIR: This session has concluded. Mr Paterson, I thank you and your colleagues for agreeing to come back to the Committee to further our inquiries. The Committee expects a response to any questions on notice by 30 January 2012, with the exception of the question in relation to the water bores. I ask that you inform the Committee secretariat about the time you require to gather that information.

(The witnesses withdrew)

MARK PATERSON, Director General, Department of Trade and Investment, Regional Infrastructure and Services, on former oath, and

MICHAEL BULLEN, Chief Executive Officer, Sydney Catchment Authority, sworn and examined:

CHAIR: Mr Bullen, are you appearing on behalf of an organisation?

Mr BULLEN: Yes, I am the Chief Executive Officer of the Sydney Catchment Authority.

CHAIR: Mr Paterson, do you wish to make an opening statement?

Mr PATERSON: No, Chair.

CHAIR: Mr Bullen, do you wish to make an opening statement?

Mr BULLEN: Yes. The Sydney Catchment Authority [SCA] has statutory responsibility for the protection of 16,000 square kilometres of drinking water catchments that supply the Sydney, Blue Mountains, Illawarra, Shoalhaven and Southern Highlands communities. Coal seam gas activities are regulated by the Department of Trade and Investment, Regional Infrastructure and Services and the Department of Planning and Infrastructure. However, the SCA provides expert advice on how these activities may affect stored waters, water supply infrastructure and related land before approvals are given. The SCA at all times seeks to ensure that water quality is protected in line with our statutory obligations, that the integrity of the water supply infrastructure is maintained and that the catchments are not compromised. The SCA controls access to special area lands and applies conditions on access. Access to special area lands for coal seam gas exploration is granted where the SCA is satisfied that the activity does not pose a risk to sustainable water management and will not impact on water quality, water quantity or the ecological health of the catchments, as well as the water supply infrastructure.

The SCA has developed six principles it considers essential in relation to giving consideration around the effects on the drinking water supply system that are to be applied to both mining and coal seam gas activities. They are: the protection of water quantity; the protection of water quality; the protection of water supply infrastructure; the protection of human health; the protection of ecological integrity; and the need for sound and robust evidence regarding environmental impacts, including potential cumulative impacts and the potential for full development of projects. The SCA advocates these principles when advising proponents on proposals being assessed for coal seam gas exploration and production and will apply them when considering applications for access to land within the Sydney Catchment Authority areas.

Special area catchment lands are areas where access is controlled by the SCA for the protection of water quality under the Sydney Water Catchment Management Regulation 2008. To enable access for exploration the SCA requires proponents to prepare an environmental management plan in order to ensure the protection of water quality. Work cannot commence without the approval of the environmental management plan by the SCA. The SCA applies the neutral or beneficial effects test in its response to planning applications. That neutral or beneficial effects test relates to water quality. Specifically this test requires examination of the potential for impact upon the catchment and water sources that might compromise the water quality within a catchment. All proposed activities within the SCA lands are subject to these criteria. The SCA also has a number of science staff who are responsible for researching and monitoring the impacts on groundwater and surface water activities within its area of operations. The SCA also has a number of planning staff who review and have input into the planning and approval process as conducted by the New South Wales Government.

CHAIR: You answered a question I was about to ask by way of clarification. To confirm in my mind, the Sydney Catchment Authority has its own staff who are technically qualified to carry out assessment and monitoring?

Mr BULLEN: Yes, we have planning staff who consider planning applications within the 16,000 square kilometres. As well as that, we have science and research staff who undertake research into surface water and groundwater within our area of operations.

CHAIR: And monitoring of compliance?

Mr BULLEN: We also have compliance staff who monitor compliance of activities that are undertaken within our lands.

CHAIR: To catch all those nasty fishermen sneaking in?

Mr BULLEN: We have particular requirements around access.

The Hon. JEREMY BUCKINGHAM: My question relates to the neutral or beneficial test. What is the Sydney Catchment Authority's view broadly on coal seam gas in the catchment area? Does it think it will meet the test of being neutral or beneficial?

Mr BULLEN: The way the SCA has approached this issue is to consider that coal seam gas can proceed through a number of phases. The first of those phases is the exploratory phase, which can require the drilling of exploration bore holes. The second phase starts to move the activity into the production phase which consists of dewatering, fracturing and horizontal drilling. The third phase is full production where the well heads are producing gas and it is being transported to a processing facility.

In relation to the information that the SCA has, certainly we believe that there is a low risk of potential impact on water quality at the exploratory phase. The way we have looked at this is the conditions that might be applied to the exploration phase. In relation to the one company that has activities within our area of operations, Apex Energy, and the planning approval conditions, we have provided advice in relation to those so that the potential impact on water quality is low.

The Hon. JEREMY BUCKINGHAM: That is interesting you say that. It makes sense you would have a staged response to the industry because it rolls out in a staged way. You said that the authority's view is that the exploration phase was low risk. Yet in the submission to the Department of Planning for an additional exploration bore hole in the special catchment areas the Sydney Catchment Authority said it "does not support this modification application. In relation to the closed fire road 9A, the SCA does not support this modification application. The SCA also wishes to advise that in its capacity as the owner of the land on which this additional bore hole is intended to be located that it is unlikely to consent to the location of that bore hole on the SCA's land." Even though it is considered low risk and the more low impact of the activities, the SCA has objected so far to that exploration?

Mr BULLEN: In relation to that submission for the Department of Planning's consideration of the sixteenth bore hole, advice that the SCA had from Apex Energy was that there was an alternate bore hole that was suitable for drilling. On that basis we objected to that sixteenth bore hole because of the reopening of a closed fire trail and the clearing that would be required. The Department of Planning through the planning approval process considered the SCA's input into that area and made a decision based on the potential impact, as they are required to do under the Environmental Planning and Assessment Act.

The Hon. JEREMY BUCKINGHAM: The only objection of the Sydney Catchment Authority was that it was using and widening an access through a fire trail?

Mr BULLEN: The fire trail had been closed for a number of years and had revegetated. I understand there are threatened species along that fire trail as well. Therefore, given that Apex had identified in one of its documents the potential for an alternate site, the SCA said that in its consideration there were a range of potential environmental impacts and therefore made an objection to the planning proposal.

The Hon. JEREMY BUCKINGHAM: The objections were only to do with vegetation clearance and had nothing to do with any other considerations?

Mr BULLEN: Certainly we gave advice to the Department of Planning in relation to the way the exploratory drilling could be conditioned, including particular requirements about the management of surface water or water that may be produced as a result of the drilling and some particular requirements about the protection of the environment. But they would be consideration of best practice that should be applied in drilling.

The Hon. JEREMY BUCKINGHAM: You said that you considered exploration low risk. What is your view of the other processes: pilot production, production, pipelines and ongoing maintenance? Has the

Sydney Catchment Authority done a risk assessment of the various phases of coal seam gas development? What is that assessment?

Mr BULLEN: In some ways this is a hypothetical question because at the moment the only approval is for exploratory drilling. The most recent Department of Planning decision makes it very clear that this approval is for exploration drilling only and any subsequent activity would be subject to a completely separate planning proposal and consideration by Government. To come to the other part of the question that you asked, the SCA, as part of its due diligence about understanding this industry, has gone through and looked at the various phases of the operation of coal seam gas and considered other potential impacts on the environment as this activity may proceed and made a determination that the risks can be greater as it moves to dewatering and fracturing, for example, and also in relation to production. If production requires the clearing of vegetation, for example, within an area of operations then there is a potential for risk to water quality as a result of that.

The Hon. JEREMY BUCKINGHAM: Is that a formal process you have done? Did you commission work from staff on that? Did you produce a strategy document or a paper in that regard?

Mr BULLEN: No, we did not produce a paper but we looked at the range of activities and produced a table that identified what those risks may be. In doing a risk assessment process, there are a number of things that are considered. In a risk assessment process there are two outcomes. One is a risk where that activity is not modified or mitigated. Then there is a residual risk after mitigation and modification actions are undertaken.

The Hon. JEREMY BUCKINGHAM: Can you table that risk assessment?

Mr BULLEN: I will take that on notice and provide it to the Committee.

The Hon. JEREMY BUCKINGHAM: Thank you. In your submission to the department of planning you state that there be further consultation with the SCA if the recommendation for disapproval is supported, which obviously it was not; it was approved. How has that consultation occurred? Is it just with industry? How is the industry informing you of what it is doing in the special catchment areas and the wider catchment?

Mr BULLEN: In relation to consultation, during consideration by the Planning Assessment Commission of that 16th borehole application, the SCA provided evidence for the Planning Assessment Commission of information that we had. Some of that information related to, to our knowledge, some improvement in the environmental approval outcomes that were developed for that 16th borehole, such as the introduction of a requirement around baffle and holding tanks around both the water being brought to site and the water that may be made during the exploration process.

Given the department of planning has approved that 16th borehole, we are just going through our work internally within the organisation around what steps are necessary. For example, the planning approval process requires the company, Apex, to produce environmental management plans and water management plans that must be discussed with the SCA. We need to look at those. The second thing is that we need to look at what our access consent conditions and provisions may involve in relation to provision of information from the company to the SCA. The third element will be the compliance regime that we will seek to apply while that activity is undertaken in the special areas.

The Hon. JEREMY BUCKINGHAM: Can you understand the community's concern about the development of the coal seam gas industry in the special catchment areas where they are well signposted, it is a huge area, a fine potentially of up to \$11,000 for entering that site? Can you understand the community's concern and how do you plan to respond to that if a coal seam gas industry is established, on top of coalmining which already occurs in those areas, in the special catchment areas? How will you communicate to the community that this is of benefit to their drinking water supply or neutral?

Mr BULLEN: Once again I think you need to give consideration that at the moment the Government, through the department of planning, has provided approval for the drilling of 16 boreholes within those particular locations and they have made it explicit in that approval process that this is for exploration only. I would add that the special areas down in the metropolitan area have been, as you have highlighted, subject to coalmining for 120, 130 years. Within those areas there have been in excess of 1,500 bores drilled for a range of purposes, both for coal exploration, groundwater monitoring and a range of other activities. So in relation to the decision that has been made around the exploratory boreholes for Apex Energy it is an activity that—sorry, the

drilling activity is similar to, if not the same as, the drilling activity that is undertaken for coal exploration around those areas and has occurred for at least the last 50 years.

The Hon. JEREMY BUCKINGHAM: There have been significant impacts. I toured the special catchment areas just last week and I thought I saw some significant impacts on the ecology and rivers there. Do you think the cumulative impacts should be considered because the production phase of coal seam gas would look very different to the exploration phase, or is the catchment authority happy to open up the special catchment areas to any industrialisation, maybe a cement works, aluminium smelter or nuclear power station if the Hon. Scot MacDonald and the Hon. Dr Peter Phelps get their way? Are we looking to industrialise our catchments, in short?

Mr BULLEN: Coalmining has occurred within those areas for 130 years. The long wall coalmining method has had impacts, but this inquiry relates to coal seam gas. Once again I would say that the Government has made a decision about the approval of 16 exploratory boreholes within our area of operations. To think about where this may go in the longer term around full production is something that we need to be mindful of but it is not something that is a prospect at this particular moment and that will be subject to a completely separate environmental approval process.

The Hon. RICK COLLESS: Does the SCA hold data about groundwater reserves in the Wingecarribee, Camden area?

Mr BULLEN: We have information in relation to the Wingecarribee area because of a project that was undertaken a number of years ago around bore fields in the Kangaloon area. In relation to the Camden gas area, that is outside our area of operations so we do not have any information about that.

The Hon. RICK COLLESS: What can you tell us about the Wingecarribee area from your experience? What can you tell us in general terms about the depth of the aquifers in that area?

Mr BULLEN: I would have to take that question on notice and we will be able to come back to the Committee on it.

The Hon. RICK COLLESS: You mentioned the 1,500 bores that have been drilled in that SCA area. Do you monitor any of those on a regular basis to determine what is happening underground?

Mr BULLEN: I think there are two parts. I would like to answer that question in two parts. The first part is that generally that exploratory drilling consists of—boreholes are about 100 millimetres in diameter, about four inches. They are generally drilled and core samples are taken. They are then rehabilitated, filled and then the ground is restored. What the SCA does have though in relation to monitoring of surface and groundwater in the special areas is we undertake extensive ground and surface water investigation. We have been doing that for a number of years so that we may obtain a much better understanding of the potential impact of coalmining, which was when we commenced that, and we are starting to get a very good picture of the surface and groundwater status within those special areas and how it responds under particular activities.

The Hon. RICK COLLESS: The bores that were drilled for exploratory purposes have since been rehabilitated. Do you have access to the bore log information which would describe the strata and what they found underground as they were drilling, I would assume?

Mr BULLEN: Yes, I would presume so. I will have to take that on notice though.

The Hon. Dr PETER PHELPS: Presumably there are a lot of potential risks to Sydney's water in the catchment authority area. For example, you could have a truck overturn and spill its load into the river system, you could have some sort of industrial accident, you have the open channel. Just outside Campbelltown there is an open channel which goes across the Hume Highway. There are quite a few potential risks to Sydney's water supply, are there not?

Mr BULLEN: Yes.

The Hon. Dr PETER PHELPS: Part of your job is to assess and manage those risks so that even if they are not eliminated they are reduced to the lowest possible level, is that correct?

Mr BULLEN: Yes, that is correct.

The Hon. Dr PETER PHELPS: And you have quite extensive powers to ensure that those risks are minimised, do you not?

Mr BULLEN: We have powers, yes.

The Hon. Dr PETER PHELPS: Do you believe that you need additional powers?

Mr BULLEN: I am not too sure I understand.

The Hon. Dr PETER PHELPS: That is okay. The point is that at the current time the basin faces risks which are effectively managed by your authority and that this is not bizarre or unusual where something may arise where you are supposed to assess it and then make recommendations in relation to it, is it?

Mr BULLEN: One point of clarification. You mentioned the basin—

The Hon. Dr PETER PHELPS: Sorry, the catchment area.

Mr BULLEN: Yes. In this instance an application was made through the Department of Planning and Infrastructure in 2008 I think for 15 boreholes within our area of operations. The SCA considered that and provided advice to the department of planning, and the department of planning made a decision based on the information and evidence that was presented.

The Hon. Dr PETER PHELPS: What is the smallest dam you have in that southern region?

Mr BULLEN: I would have to take that on notice.

The Hon. Dr PETER PHELPS: Cordeaux, Avon?

Mr BULLEN: I think it is most likely Cordeaux.

The Hon. Dr PETER PHELPS: That would have many megalitres of water in it, would it not?

Mr BULLEN: It has a large volume of water in it, yes.

The Hon. Dr PETER PHELPS: Let us assume a worst case scenario: an above ground produced water tank ruptured and maybe 100,000 litres of saline water flowed into that smallest of all dams. What would be the practical effect on water quality if that were to occur?

Mr BULLEN: It would depend on the amount of rainfall activity and other dilution that was occurring. By way of example, in 2007 when Warragamba dam had a large blue-green algae incident, that algal incident occurred because the storage level in the dam was low as a result of the drought. The water that flowed into that dam was of a cold temperature. It flowed along the bottom of the dam, which then caused an upwhirling of the nutrients that were in the bottom of the stored reservoir. They then mixed with the surface water and then those nutrients provided a medium for algal growth to occur. In relation to the risks of an accident such as the rupturing of a tank or whatever, it would depend on, first, the size of the tank; second, the amount of dilution or activity that occurred; and, third, the particular temperature of the water and the speed with which it flowed from where the incident occurred to where the off-take may be for drinking water purposes or for supply to Sydney Water for drinking water purposes.

The Hon. SCOT MacDONALD: The Chair has let me ask a question of Mr Paterson that probably backtracks a little. Can you give me an opinion about the possible impact on New South Wales if there was a moratorium on the development of this industry, as has been suggested at the State and Federal levels? Is there any impact on sovereign risk? Is there any impact on us as a desirable destination for development investment?

Mr PATERSON: Certainly the resource industry is a significant contributor to welfare, to investment, to employment in New South Wales. It is a significant contributor to government revenues in New South Wales. Impeding the development of an industry has negative consequences. It is hard to quantify that because we have already given evidence that this is a relatively immature industry but one that, given the one million households

on reticulated gas and 6 per cent of indigenous supplies, you would hope that we were able to see appropriately developed. It is very difficult to quantify precisely what the negative consequences would be but you could confidently predict that there would be negative consequences in relation to employment and investment and in relation to government revenues.

The Hon. SCOT MacDONALD: Further to that, are you hearing any overseas whispers or whatever about our desirability and security as an investment destination when proposals about moratoriums are put up?

Mr PATERSON: I think that assessments about investment are a combination of many factors. They are what I might describe as a risk-adjusted after tax return on what the intervention might be. Uncertainty in relation to government policy is a negative in relation to offshore investment. Uncertainty in relation to tenure over a particular province can have negative consequences. Policy change and people or governments or political parties saying one thing and then doing another are all factors in to a consideration of the risk associated with investment in a particular province.

The Hon. SCOT MacDONALD: Mr Bullen, what are the most significant threats to water quality in the Sydney catchment area?

Mr BULLEN: We consider the risks for Sydney drinking water in a number of ways. The first one is in relation to pathogens such as cryptosporidium and giardia. The second one may be the risk of contamination via a terrorist incident, for example, a security incident. The third one that you categorise is the risk of turbidity and a large amount of dirty water getting into the system. Then the fourth one can be the risk of metal contamination, et cetera, that might also occur.

The Hon. SCOT MacDONALD: Heavy metals?

Mr BULLEN: Heavy metals or a range of other metals as well.

The Hon. SCOT MacDONALD: Is that from existing sources?

Mr BULLEN: There are metals moving through the area. But for example, in the Lithgow area, with the power stations up there, there are a range of metals produced as a result of that activity and there can be a potential risk of those being there, but at this stage we have not detected any heavy metals through the system.

The Hon. SCOT MacDONALD: That is the top four of five threats?

Mr BULLEN: Off the top of my head, yes.

The Hon. SCOT MacDONALD: We visited Camden on Friday and we were told that has been operating for 10 or 15 years. Have you recorded any impact on Sydney's water quality from those activities?

Mr BULLEN: As I outlined to Mr Colless earlier, the Camden gas field is outside the Sydney Catchment Authority's area of operation. In relation to monitoring, we do not do specific monitoring around the AGL project. What we do monitor is the water quality in the upper canal and at this stage—and I would need to double-check this—we have not seen any change in the water quality in the upper canal as a result of the activity.

CHAIR: Is there a map that shows the extent of your area of operations, as you describe it, on your website or anywhere in the public domain?

Mr BULLEN: Yes, there is. It is on our website.

The Hon. JEREMY BUCKINGHAM: You relied on the assessment of the department formerly known as the Department of Environment, Climate Change and Water [DECCW] in your assessment of that 16th borehole that the removal of vegetation and that endangered ecological community was a risk. On the basis of that you said that you did not support the development. Is it not foreseeable that there will be a considerable amount of vegetation clearance for any pilot or full production of coal seam gas, and ultimately you will have to oppose coal seam gas in the special catchment areas because of vegetation clearance?

Mr BULLEN: Specifically to that 16th borehole, the Office of Environment and Heritage have responsibilities under the threatened species legislation to give consideration about the potential impact of an activity on threatened species. They provide advice to the Department of Planning which is given consideration when the Department of Planning makes a decision.

To come to the second part of your question around the potential of full production CSG activity occurring in the special areas, as I have said earlier, that is not under consideration by the Government at the moment. That being said, we know that when gas production does move to full production then there are a number of wells drilled and there are pipelines and access roads linking those particular activities. The potential impact of those activities on both the ecological integrity of the special areas and the drinking water is unable to be determined at this particular point in time because the specific activity has not been defined and an application made.

The Hon. JEREMY BUCKINGHAM: There is a disconnect in logic there. You say in your submission:

The SCA considers the impact identified by DECCW is not consistent with the protection of ecological integrity, which is one of the SCA's main goals in the management of the special areas.

I cannot see how you can acknowledge that full production will mean major vegetation clearances which will be completely counter to your main goals of ecological integrity and water quality. I do not know why the Sydney Catchment Authority is not opposing or ruling out or asking the Government to rule out any coal seam gas in the special catchment areas because it is foreseeable that that is exactly the way it is going. Why would you have exploration if you were not going to go to production? If you are going to go to production you are going to end up clearing vegetation.

Mr PATERSON: Mr Chairman, I am sure which of that suite of questions Mr Buckingham is putting. At least in relation to some part of that he was what might affectionately be described as verballing what Mr Bullen said. I do not think that much of the early part of that which asserted propositions reflects what Mr Bullen said.

CHAIR: Order! Thank you, Mr Paterson. I will rule the question out of order.

The Hon. JEREMY BUCKINGHAM: Is it foreseeable that coal seam gas will undermine the ecological integrity of the special catchment areas and have potential negative impacts on water quality in those areas?

Mr BULLEN: As I have said earlier, the ability to answer that question depends on the scale and the potential impact of that potential activity. We could go through an exercise of considering the number of production wells that may be produced as result of an activity, we could determine what the average clearing of those wells is, we could determine the average clearing width for linkage of pipelines and trails, but until the specifics are put on the table it is very difficult to say what the impact on the ecological integrity may be.

I would also add that Government has made a decision and made it explicit in the approval of the 16th borehole that at the moment it is making a decision based on exploration only and any subsequent activity will be subject to a completely separate environmental approval process. I think they even went so far as to say that there should not be an expectation that just because exploration has been approved it would automatically segue into production.

CHAIR: Mr Paterson and Mr Bullen, thank you for your evidence. We greatly appreciate your presence here. In relation to questions on notice, if they could be provided to the Committee by 30 January we would appreciate it.

(The witnesses withdrew)

(Luncheon adjournment)

RICHARD JOHN WILKINSON, Chief Operating Officer, Eastern Australia, Australian Petroleum Production and Exploration Association, and

MATTHEW ANDREW MATHER PAULL, Director for Policy, Queensland and New South Wales, Australian Petroleum Production and Exploration Association, affirmed and examined:

CHAIR: Would either of you like to make an opening statement?

Mr WILKINSON: I will make a brief opening statement. There is no question that today coal seam gas is a material part of the eastern Australian energy mix. The amount of proven and probable gas reserves in eastern Australia has grown to 83 per cent of the gas reserves in eastern Australia. Already one-third of eastern Australia's natural gas comes from coal seams. This has attracted global attention and has seen the commitment of over \$45 billion in three liquefied natural gas [LNG] projects. The industry now employs over 9,000 people, but despite having great potential the industry is only at the formative stage in New South Wales. None of this can progress without the support of New South Wales communities, the Government and the businesses associated with the sustainable development of our world-class coal seam gas resources. I understand this is clearly the focus of the Committee and my colleague Mr Matt Paull and I will be happy to take questions.

The Hon. JEREMY BUCKINGHAM: This morning the Committee heard evidence from Beyond Zero Emissions raising significant questions about the Australian Petroleum Production and Exploration Association [APPEA] claim that coal seam gas used for electricity production is up to 70 per cent cleaner than coal. Do you acknowledge that that claim is based on a comparison of the absolute worst case scenario for coal compared to the best case coal seam gas scenario?

Mr WILKINSON: No, I categorically deny that. The comparison is clearly between a standard combined cycle gas turbine, which is the standard base load method for generation and the absolute best case coal-fired plant, the median and the worst case. That is clearly set out in the report which is available on our website.

The Hon. JEREMY BUCKINGHAM: The report or the submission?

Mr WILKINSON: The Worley Parsons report is available—

The Hon. JEREMY BUCKINGHAM: I was referring to your submission. Your submission says in terms of fugitive emissions, which are a significant contributor to the whole of life cycle emissions intensity of coal seam gas:

Fugitive emissions - whether associated with coal seam gas or conventional gas - make no difference to the fundamental point that emissions associated with gas-fired electricity are up to 70 per cent fewer than traditional sources of electricity generation.

Is that a misdirection? How can fugitive emissions make no difference to the whole of life cycle emissions intensity of coal seam gas?

Mr WILKINSON: It is a question of materiality. Fugitive emissions, as outlined in the Worley report, are 0.1 per cent of production. For me that is a question of materiality and it does not change the fact that coal seam gas-fired power generation is better than coal-fired generation by a considerable margin.

The Hon. JEREMY BUCKINGHAM: You make that assertion but surely fugitive emissions, even if .001 or whatever it says in the Worley Parsons report, make some contributions to the emissions intensity.

Mr WILKINSON: I think it is clearly a question of materiality. We addressed that in the Worley Parsons report. Fugitive emissions of about 0.1 per cent are the industry standard as advised to us by Worley Parsons in that report. They looked a little harder and said, "What would we need to change in order for this to be break even?" If we took the worst case, which is an open cycle gas-fired plant, the most inefficient plant we have in Australia, and compared that with the very best coal-fired plant in the world, of which there are none in Australia, the ultra super critical coal-fired plant, you still get the same result that gas is better than coal. Only when you increase the gas used for compression and processing by a factor of 50 per cent do you get a similar answer. Therefore, I think 0.1 per cent is not material.

The Hon. JEREMY BUCKINGHAM: Yes, but that is if you accept the 0.1 per cent figure. In your report there is a section on fugitive emissions and you cite three papers, from the CSIRO, the International Energy Agency [IEA] and Sydney University. I looked at those links but none of them deals with fugitive emissions from coal seam gas. Why have you included those three references as indicating that the fugitive emissions from coal seam gas are immaterial, as you put it, when they make no reference to any analysis or credible science regarding fugitive emissions from coal seam gas?

Mr WILKINSON: I still think that those studies I have cited show very clearly—

The Hon. JEREMY BUCKINGHAM: Which studies, Mr Wilkinson?

Mr WILKINSON: The CSIRO, the International Energy Agency and the Australian Energy Market Operator.

The Hon. JEREMY BUCKINGHAM: Are you saying they make reference in those—

CHAIR: Allow the witness to answer the question and then you can ask another question.

Mr WILKINSON: The material difference there would not change the story with regard to fugitive emissions. However, I can refer you to a Carnegie Mellon study, which looked at total emissions. I can make that available to you. When they compared conventional gas to, in this case, shale gas, they found only a 3 per cent increase relative to life cycle emissions.

The Hon. JEREMY BUCKINGHAM: A 3 per cent increase?

Mr WILKINSON: Over conventional gas.

The Hon. JEREMY BUCKINGHAM: What was the conventional gas?

CHAIR: Could you table that study or take that on notice?

Mr WILKINSON: Yes.

The Hon. JEREMY BUCKINGHAM: I go back to the three references on which you based your submission to this parliamentary inquiry. Why is it that none of those refers in any way to fugitive emissions or gives any analysis of the whole of life cycle fugitive emissions from coal seam gas?

Mr WILKINSON: You are asking me to comment about the authors of those and I do not think that is the right thing for me to do.

The Hon. JEREMY BUCKINGHAM: I am not asking for comment on the authors. You say, "This is illustrated in work published by" the CSIRO, the International Energy Agency and Sydney University, yet they do not talk about the fugitive emissions from coal seam gas whatsoever.

Mr WILKINSON: Not from coal seam gas, no, because at that stage coal seam gas was still an infant industry.

The Hon. JEREMY BUCKINGHAM: When these articles were published?

Mr WILKINSON: Yes.

The Hon. JEREMY BUCKINGHAM: I think all those articles were in the last year or two and coal bed methane has been in the United States for some time.

Mr WILKINSON: Let us be clear. The Australian Energy Market Operator [AEMO] does include the full life cycle emissions. That is my understanding.

The Hon. JEREMY BUCKINGHAM: Of coal seam gas?

Mr PAULL: The table we have copied from the AEMO report shows fugitive emissions for a number of power stations that run from coal seam gas.

The Hon. JEREMY BUCKINGHAM: I am not talking about the AEMO report; I am talking about the CSIRO report, the International Energy Agency report and the Sydney University report. If you do not know, that is fine. Do you acknowledge that the basis for your assumptions on fugitive emissions is based on the 1996 United States Environmental Protection Agency Gas Research Institute study titled "Methane emissions from the natural gas industry"?

Mr WILKINSON: My reference to the 0.1 per cent is from the Worley Parsons report, which shows that that is the industry practice.

The Hon. JEREMY BUCKINGHAM: The United States EPA has stated in the more recent report, "Greenhouse gas emissions reporting from the petroleum and natural gas industry":

... new data and increased knowledge of industry operations and practices have highlighted the fact that emissions estimates from the EPA/GRI study are outdated and potentially understated for some emissions sources. The following emissions sources are believed to be significantly underestimated in the U.S. GHG Inventory: well venting for liquids unloading; gas well venting during well completions; gas well venting during well workovers; crude oil and condensate storage tanks; centrifugal compressor wet seal degassing venting; scrubber dump valves; onshore combustion; and flaring.

Do you stand by your assertion in the Worley Parsons report that despite many government bodies and scientific institutes saying that fugitive emissions have actually been underestimated you are revising your figure down to 0.1 per cent or whatever?

Mr WILKINSON: The 0.1 per cent is the current standard that we work to. As more information comes in, and it will over time—they have been reviewed in the past and will be reviewed in the future—we take that into consideration with the industry. It is in the industry's best interest to understand about fugitive emissions for three reasons: firstly, for safety; secondly, the impact on the environment, which we need to report on a regular basis; and thirdly, it is valuable gas. We make money by capturing it and selling it on to customers, not releasing it to the atmosphere. The figure of 0.1 per cent is a small volume.

The Hon. JEREMY BUCKINGHAM: Yes, but do you not also avoid paying a carbon tax, a price on those emissions? Is there not a fourth factor—that it is in your interests to underestimate them? It is a risk to the economic viability of the industry. If the emissions are higher you will be paying more for them.

Mr WILKINSON: It would be a very poor financial system that encouraged you to avoid taxes by not capturing a resource which is valuable. We are happy to pay tax—

The Hon. JEREMY BUCKINGHAM: I am not saying not capturing but not declaring.

Mr WILKINSON: We have to report on a regular basis to the Government all the emissions, including these fugitive emissions. That is a requirement for us to report.

The Hon. JEREMY BUCKINGHAM: Okay. Has anyone from your organisation spoken with Worley Parsons in relation to the work commissioned by Beyond Zero Emissions for comparison of greenhouse gas emissions between gas and energy sources?

Mr WILKINSON: No, and it would be inappropriate for us to talk to Worley Parsons about any dealings they would have with their other customers.

The Hon. Dr PETER PHELPS: No conspiracy there, Jeremy.

The Hon. JEREMY BUCKINGHAM: There is an increasing concern and awareness in the community about coal seam gas. Is the industry monitoring or assessing or cognisant of an increased reluctance of landholders to sign access agreements?

Mr WILKINSON: What the industry tries to do with landholders is to create a relationship of trust such that we are able to work in coexistence with the farmers and achieve our outcomes for the energy industry. There are several thousand agreements reached with farmers that indicate that we are doing that.

The Hon. JEREMY BUCKINGHAM: There must be a trend—the industry has to sign new agreements for exploration, pilot production and production—is there an increasing reluctance? Do you keep an inventory of the number of access agreements signed across New South Wales and Queensland?

Mr WILKINSON: We track the number on a periodic basis.

The Hon. JEREMY BUCKINGHAM: Is it decreasing? Is there a trend where you can see that it is increasingly difficult to sign access agreements?

Mr WILKINSON: I have not identified that trend, no.

The Hon. JEREMY BUCKINGHAM: Have you signed more access agreements this year compared to last year?

Mr WILKINSON: I do not sign agreements, our members do that.

The Hon. JEREMY BUCKINGHAM: Have your members signed more agreements last year, compared to this year?

Mr WILKINSON: It is irrelevant, because it depends on the activity and the plans of the operators and whether they do or do not sign.

The Hon. JEREMY BUCKINGHAM: I do not think it is irrelevant, I think it is an important point. That is, there is increasing community concern and therefore resistance and if people will not let you on to their land and want to go to arbitration and potentially to the Land and Environment Court, it is a major risk to your industry and an important consideration for legislators. Would you be prepared to table a list of the number of access agreements that the bodies that you represent have been able to sign?

Mr WILKINSON: I can put a request to the members to provide that data to me but I am unable to directly address it myself.

The Hon. Dr PETER PHELPS: There has been a lot of distortion and misinformation put about by various people about coal seam gas. Could you highlight some of your experiences with this distortion and particularly with relevance to recent Australian Broadcasting Commission reports?

The Hon. JEREMY BUCKINGHAM: Point of order: The question contains argument.

CHAIR: I request members to ask questions that do not require witnesses to form their answers based on hypotheses. Questions should be asked in a way that will allow witnesses to best answer the question in a manner that will benefit the deliberations of this Committee. Please be careful in the forming of your questions, gentlemen.

Mr WILKINSON: I make the general point that, as an industry, we are advocates for openness and transparency. As far as we are concerned, the more data that is available in the public domain to build trust, the better. There is a number of areas where we have demonstrated that, for example, the transparency regarding fracking chemicals where information is available on the public website. Other issues are also addressed, such as the water portal where the public is able to see measurements as they come in and the history itself. So when we identify areas where we think the industry has been misrepresented or where the position that is put is less than even-handed, we will point out what we see as biased or wrong facts that are put in the public domain. In the particular instance referred to from the last question, we have done that with the Australian Broadcasting Commission and pointed out errors of fact and bias on the website that we have asked them to pay attention to.

The Hon. Dr PETER PHELPS: I also understand that there were concerns about the use of facts which are relevant to shale gas operations, as opposed to coal seam gas operations. Could you elaborate on that, please?

Mr WILKINSON: Yes. The coal seam gas industry has to contend with the constant problem that examples are taken, not from Australia where there are very few shale gas wells, but from America where it is a different technology at different depths. Shale gas is typically found at about 3,000 to 5,000 metres, whereas coal seam gas is found at 300 to 500 metres, perhaps as deep as 1,200 metres, so an order of magnitude which is

significantly different. The stimulation technologies are also quite different, requiring much larger horsepower. So, as an industry we are constantly pointing out areas where facts from shale gas have been held up as examples of coal seam gas and there has been at least one example I am aware of where testimony has been put forward where the words "shale gas" have been replaced by "coal seam gas", and I think that is misleading.

The Hon. SCOT MacDONALD: Can you give me your view about the potential impact of a moratorium? I am talking about the proposed moratorium either at a local or State wide level. What would be the impact on our energy, security, energy pricing and our desirability as a destination for investment?

Mr WILKINSON: A moratorium can take different shades and time frames. If I might begin with the short term moratorium, the question I would raise is: a moratorium for what purpose? If it is for the gaining of additional data or further study, more often than not the exploration phase is about fact gathering and data. So when the community asks what I think are reasonable questions: How many wells? Where are the pipelines? How much water is being produced? In fact, the answers come from the exploration phase, where the rocks are tested and the gas and water is flowed, in order to collect that data.

So a moratorium is actually very counterproductive because a moratorium which is waiting for answers which can only be collected from exploration, gets you into a situation where you cannot move forward. It is important that we continue with exploration. In my view exploration cannot and will not damage aquifers because the exploration wells are single, isolated wells, two or three at the most in an area, and their purpose is to produce water, to produce gas and to make the measurements. At that point we use that firm data, from a fact base, to put the proposal to go forward to production. That is the right time for the Government, the regulators and the communities, to take a close look at what is proposed before we go forward.

On the second issue, your broader question about a moratorium, yes indeed, it increases the cost because now we have to stand down rigs and put them aside and if there is a good reason to do that, then that is what we have to do but it does increase costs. The second thing it does is, it creates uncertainty and with an overseas investor, uncertainty is considered to be an important issue. Finally, I remind the Committee that, while all these things are going on, capital is a global commodity. How we are perceived in New South Wales as an investment destination is an important part of how much money comes to be invested in this State. If we are seen as high risk, too hard, too much trouble, that capital will go to another State or another country. It is easy for global capital to do that.

The Hon. SCOT MacDONALD: I want to go over that part of your submission about cultural impact and food security which was prepared in September. Can you speak briefly about the impact on agricultural production and food security?

Mr WILKINSON: It is an important question. We are of the view that agriculture and coal seam gas can coexist and that it does coexist, keeping in mind that on-shore gas production in Australia has been going on for more than 50 years at the same time as agriculture. One of the challenges that the coal seam gas industry faces is the fact that we do not take over land, it is a small part—typically a 15 by 15-metre area—that is required. I understand that you have seen the wells in Camden and understand the impact their size has on the land. They generally have underground pipes and wires and the impact is relatively low. So we think that coal seam gas and agriculture can coexist.

The other thing I would like to point out is in relation to, not just the footprint on the land, which is one or two per cent, but I would like to refer to a couple of reports that address the issue of global food security. A report from the Australian Bureau of Agricultural and Resource Economics and Sciences states that a number of things affect food productivity, one being the poor prices our farmers get. They indicate from their analysis that if the price of food goes up, productivity will go up dramatically and the report states that 10 to 40 per cent of the post harvest is lost from waste. For me, those are the areas to focus on in terms of bringing food productivity up, not the one or two per cent footprint that coal seam gas may have on the land.

The technology of coal seam gas is advancing such that we are able to move wells around and be more selective about what land we operate on. Ever decreasing, as technology improves, is the impact on the land itself. Finally, I note under "Agricultural Area" in a report from the Productivity Commission, that as much as 45 per cent of broadacre farmers have off-farm wages coming in. So these are difficult times for agriculture with almost one half of the broadacre farms having wages and salaries coming in and that is something that coal seam gas can definitely help with, as we increase employment opportunities in those areas.

CHAIR: Mr Wilkinson, would you be able to provide the Committee with the references that you have quoted there on notice?

Mr WILKINSON: Certainly.

The Hon. RICK COLLESS: Mr Wilkinson, you talk about the power requirement for shale gas fracking, you said the depth was an order of a magnitude different and the power requirement was a lot more for shale gas fracking. What is the difference in the amount of power that is required?

Mr WILKINSON: I am not an expert in fracking but I understand from talking to experts that it is an order of five to ten times the amount of horsepower that is required to frack shale, compared to the shallower coal seam gas and of course coal is a softer rock, compared to shale.

The Hon. RICK COLLESS: In your submission you say that fracking has been done in Australia since 1968. Can you tell us where that has happened, what it was for and what the results have been, in terms of the environmental impact?

Mr WILKINSON: My experience is in the areas of the Cooper Basin, where the rocks are extremely tight. It is a huge challenge and a credit to the exploration and production companies working in those areas that they are able to get the gas to flow from what in other parts of the world would be called very tight rock, almost unconventional gas. That has been supplying gas to Sydney for decades. So the fracking is an important part for certain parts of the reservoir where you need to increase the permeability. Typically about five per cent of those wells are fracked—it depends where you are in the reservoir.

The Hon. RICK COLLESS: How many wells extract the gas from the Cooper Basin field?

Mr WILKINSON: Thousands but I do not have the exact number.

The Hon. RICK COLLESS: Do you have any idea of the depth?

Mr WILKINSON: It can be up to 4,500 metres in depth.

The Hon. RICK COLLESS: It would be closer to a shale gas operation than a coal seam gas operation?

Mr WILKINSON: Indeed.

The Hon. GREG DONNELLY: Thank you for coming along this afternoon and providing us with an opportunity to ask you some questions. My first question is very general, and you might need to take it on notice. In the hearings that the Committee has had here and in its travels around the State some mining companies have taken the opportunity to come and give evidence. The mining companies themselves have said that the industry is not without its issues in terms of how it progresses into the future. It is a new industry. Clearly, there are some reservations, some opposition and potentially question marks over some of the science. So this is not an industry with a clear-cut issue. When I read your submission, as I have done from front to back, it appears to me on the face of it you seem to be saying: There is not much to worry about at all; in fact, it's almost too good to be true; why are we even having this hearing? Let's get on with it and get the mining going.

As the peak body representing the companies that wish to proceed in this industry, what do you identify as issues that the industry really needs to front up to and address if it is to garner the support of the communities in which those companies will need to operate? Clearly, there is push-back occurring, and there are concerns. I suggest if we were to circulate this submission to all those who have come along and expressed objection to this industry they would say, "Yes, that is what the peak body says." Surely you have a view that some issues need to be addressed if this industry is to advance in the way that you hope.

Mr WILKINSON: It is quite a detailed question that you have asked me. My experience is that when you get closest to where most of the activity is, you generally get more support; and as you get further away from those areas, to places where there is either not a track record of interaction and people are hearing stories from second and third parties and seeing websites of activists who are interested in creating an issue, the stance becomes less supportive. When I go and visit a town like Roma or Chinchilla, towns that have virtually zero employment, I find the youth are able to find a job in the local town. In Roma, there is a helicopter service with

intensive care units available, and at least four people are alive today in the community because of the availability of those helicopters for the local community. As we work through that and improve infrastructure in the areas, and increase the productivity of many farms round there because of the irrigation opportunities, there is strong support. For us, the challenge—and this applies particularly of course to New South Wales—is that we are still in early days and we have to go through the process of building the trust, building the dialogue and making sure that the companies and the communities understand each other and are able to work together to get the right answer.

The Hon. GREG DONNELLY: If I could take you up on that point. In terms of the work done by the industry in Queensland to get itself to its current size and level of operation, and the diversity of places in which it is functioning, do you think that the way that the industry has gone about this in Queensland is a blueprint to be followed by New South Wales? Or, given that we are not quite but almost setting out with a blank sheet of paper, what would you recommend that we do differently in New South Wales? What would you recommend that we do in New South Wales?

Mr WILKINSON: I think the good news story for New South Wales is that you actually can look at how it has happened across the border and learn from that, and decide how you would like to go forward here in New South Wales. Queensland is, to my mind, about 10 to 15 years further than down the track from where New South Wales is at the moment based on its status of exploration. So there is no question that there are lessons to be learned, and to make it fit and work for New South Wales is the opportunity that we now have.

The Hon. GREG DONNELLY: I am sorry to interrupt, but this is getting to the point that I hoped it would get to—the lessons to learn for New South Wales. You preside over the industry as its peak body. What do you say are the lessons to be learnt from examining what has happened in Queensland?

Mr WILKINSON: One is that you cannot under-do the communication with the communities; you cannot under-do the transparency of information; you cannot under-do the listening to the local communities as to where their preferences lie. That is a very important point, and a clear lesson from Queensland. It is almost one of those requirements that you cannot completely fulfil. I would encourage every operator in that environment to do that. Openness and transparency is a very important part, because what we are trying to do here is build trust, to build respect for each other. We know that happened in Queensland. There has been a conventional gas industry there for nearly 50 years, and it is a non-event. We have second-generation operators. So not only have the fathers and mothers worked for the operators, but they are telling their children: Go and work for these companies; they are good companies in the town to work for. We are starting to see that.

The Hon. GREG DONNELLY: The New South Wales legislative framework for the coal seam gas mining industry has not been purpose built. As you know, we have the Petroleum (Onshore) Act. The coal seam gas industry is operating within the basic framework of those two pieces of key legislation, plus a whole lot of other legislation to do with the environment, water, et cetera. Is your organisation of the view that it would be worthwhile having purpose-drafted legislation for this industry in New South Wales? Or do you believe that the existing legislative framework is suitable and works well enough?

Mr WILKINSON: I think the answer is in between the bookends that you describe. Let me explain that a little further. If your question is about what regulatory approach we should have, firstly, I would say we definitely need transparency and a data-rich environment. So the government through collecting data or requesting producers to provide that data in the public domain is to be encouraged, because we are in the business of building trust with the community. Secondly, I think there should be a visible and clear regulator. I think there is talk already about a resources commission—having someone with whom the buck stops regarding coal seam gas. That provides a go-to person who can navigate the regulations and act as a conduit for concerns.

The third one is the outcome focus. For coal seam gas, what is the outcome that we are looking for? Is it to preserve the environment in those particular areas, and provide the benchmark, and set that so that the technologies can solve it? Finally, I think about cross-industry reviews. For example, I do not believe that coal seam gas is the saviour or the demon of the aquifers of New South Wales. There is too much else involved in the areas that we have looked at, such as the Namoi catchment area. I think coal seam gas is expected to be about only 1 per cent of the off-take from there. So I think it is quite fair that the coal seam gas industry should be a part of that, but not a single part. It is a wider problem that we are trying to solve, such as the aquifer story, and we should have people round the table with that in mind.

The Hon. GREG DONNELLY: My final question goes to the moving nature of what we are looking at here. Recently we have the interim report by the Commonwealth Senate inquiry into the industry. We have also had announcements about different aspects of the industry by the New South Wales Government over the course of the past few months. Of course, last week there were further announcements about the Federal Government's thoughts about the industry. It seems a lot is happening relatively quickly, and people's minds are being focused on looking at this industry. I am particularly interested to have your thoughts on the interaction between the Commonwealth and the States on how they can work in conjunction with each other to ensure we do not have a situation of the States versus the Commonwealth, as we have seen played out in all sorts of ways in different scenarios over many decades. Do you see a framework in which the Commonwealth and the States should come together to look at this industry so that there is not a replication of work being done, or to prevent their setting themselves up to compete with each other in terms of their activities in examining the whole of the issues of this industry?

Mr WILKINSON: It is a good question, and you have got to the heart of Federation of the Commonwealth and the States.

The Hon. GREG DONNELLY: We could talk about that all afternoon, but I am sure we do not want to. Obviously, we are putting in place an industry that will be operating for the foreseeable future. So how are we going to make it work?

Mr WILKINSON: There are a few points. First is the degree to which we can and should encourage trade of data across State borders, so that when we look at, for example, the Murray-Darling and the Great Artesian Basin, we should make sure that all players relevant to that particular topic have access to the information that they need to make proper decisions. The second point is that I am of the view that the States are charged under the Constitution with looking after the resources, including the water side of things. Ultimately, the technical responsibility and responsibility to the community resides with them. Notwithstanding that, I do see, and support, the recent calls for harmonisation and bringing together, perhaps under the umbrella of the Federal Government, of the various players so that we can agree on frameworks, standards and approaches for the broad issues that cross State borders. Bottom line, I think the States are under the Constitution responsible for resources and water, but I think there is a role for the Commonwealth to ensure harmonisation particularly on issues that cross the State border.

CHAIR: How many members does the Australian Petroleum Production and Exploration Association have? You can take the question on notice.

Mr PAULL: I can take it on notice, but it is approaching 100 full members of oil and gas companies producing and/or exploring for oil and gas in Australia, and I think there are 250 or more associate members, and those are bodies providing services to the industry.

CHAIR: Do you have a code of practice for your members?

Mr WILKINSON: There is a code of practice for various parts of the industry, for example, land access.

Mr PAULL: Is there an environmental code of practice?

CHAIR: Perhaps you could provide on notice a list of what those codes cover? Better still, would you be able to provide the Committee with documentation on your codes of practice?

Mr WILKINSON: Yes.

CHAIR: One of the questions that has been raised, mostly by opponents rather than proponents, is the variability in the size and financial stability of companies engaged in exploration. The industry has probably got a hundred years of history throughout the world in petroleum exploration. I daresay it has also had a history or profile of encouraging what might be called small, speculative explorers to carry the load upfront. Therefore you have a fairly robust and well-tuned framework for farming in of the larger companies. Do you within your organisation differentiate between your full members, the gas producers, the bigger companies that are actually pumping out the gas, and the smaller explorers? Or are they just all members?

Mr WILKINSON: All members.

CHAIR: Do you have drilling contractors among your members or associate members?

Mr WILKINSON: Yes.

CHAIR: Or is it mostly only equipment suppliers?

Mr WILKINSON: No, there are associate members who are drillers.

Mr PAULL: It is all kinds of services—financial, drilling.

CHAIR: Coming back to the Hon. Greg Donnelly's question, what is your experience in dealing with an industry that is across at least three or four States now of the variability of State legislation? Does it cause your members a problem? In discussing Federal intervention—I think one of the previous witnesses used that term—do you think it would be of benefit if there was harmonisation across the States in the regulation of the industry?

Mr WILKINSON: Yes. We are on the record as supporting harmonisation in activities with the Federal Government between the States. That would make our lives easier.

CHAIR: Have you considered variability in policy and regulation and, therefore, have you come to a view that you could put to the Committee as to what areas of regulation are weakest or the most ambiguous that you would like to see addressed?

Mr PAULL: No. I think the issues identified by SCER [Standing Council on Energy and Resources] last week were a good set. It is not so much ambiguity or weakness. It is just things like construction standard. Those are the sorts of things we would benefit from.

CHAIR: As the next witness has not arrived we will take one more question.

The Hon. JEREMY BUCKINGHAM: There is obviously enormous community concern. The last two times there was exploration activity in New South Wales there were community blockades. Have you been making representations to the Government that you would like these blockades to be removed or do you believe that police force should be used to enact your exploration authorities?

Mr WILKINSON: Mr Chair, is that a leading question?

The Hon. JEREMY BUCKINGHAM: It is not leading at all. In both instances police were present. It is a real factor in the community that police were there. The suggestion in both blockades has been that the police may escort your industry's drillers on the land. Do you envisage that being a situation that will be repeated and would you support it?

Mr WILKINSON: I think this is a good example of just using the words in the right way so that now we have police "force" being used. No, that is not the position. APPEA refers to the individual operators in those areas. In both of those cases they have said publicly several times that they would not force themselves onto land where the landholder did not want them on the land. I also would like to point out—

The Hon. JEREMY BUCKINGHAM: Is that an ongoing position? If you continue to meet community resistance will that remain your policy?

Mr WILKINSON: That is the policy as stated by the members that are relevant to this discussion.

The Hon. JEREMY BUCKINGHAM: Do you commit to that for the foreseeable future?

Mr WILKINSON: That is the policy of the members.

CHAIR: That is the conclusion of this session. I thank you, gentlemen, for talking to us today. Your testimony has been valuable. Any questions on notice that the Committee has asked you to provide, if you could provide answers by 30 January 2012 that would greatly help us in our deliberations.

(The witnesses withdrew)

WARREN STEPHEN MUNDINE, Chief Executive Officer, Native Title Services Corp, sworn and examined:

CHAIR: Mr Mundine, thank you for agreeing to appear before the Committee. We look forward to your testimony. Are you appearing as representing an organisation?

Mr MUNDINE: Yes, I am here on behalf of the Native Title Services Corp [NTSCorp], which is the native title rights body for New South Wales and the Australian Capital Territory.

CHAIR: What is your position with that body?

Mr MUNDINE: I am the Chief Executive Officer.

CHAIR: Prior to questions from the Committee, would you like to make a brief opening statement?

Mr MUNDINE: Yes. As we know, the recent rise in coal seam gas activity has created a number of new policy and regulatory issues. There must be recognition that both coal seam gas extraction and exploration will affect lands in which traditional owners hold a variety of interests. Many of the traditional owners we represent believe that intra-active industries have an important role to play within the New South Wales economy and offer a valuable opportunity for the economic development of both Aboriginal people and non-Aboriginal communities across New South Wales. The nature of coal seam gas works differently to traditional mining activities. It is largely a new industry using new technologies in New South Wales.

While many Aboriginal and non-Aboriginal communities across New South Wales have longstanding experience in managing the impact of mining activities on their land and addressing the social, economic and environmental impacts of traditional extractive industries, coal seam gas actively raises new issues. We must ensure that the regulatory framework appropriately addresses these new issues, particularly the issues of ground and surface water quality, environmental outcomes, appropriately protecting culture and heritage rights and land access arrangements. This is not only in the interests of Aboriginal and other land holders and users but it also provides greater certainty and stability to industry. The obvious benefits arising from the coal seam gas industry to traditional owners in New South Wales are employment and enterprise development, but most communities do not want their developments to come at the expense of culture and heritage or their native title rights and interests. Aboriginal people should not be forced to choose between their rights and economic outcomes. In fact, we believe that they can go hand in hand through proper native title processes and working together.

At the moment most communities do not support the coal seam gas industry. These are communities that have worked with other mining industries but have particularly stated they are vehemently adverse to the coal seam gas industry due to the uncertainty of the science and the potential huge impact on their lands and waters. Land and water are of crucial significance to traditional owners occupying their traditional land not only socioeconomically but culturally and spiritually. Traditional owners often express the view that without their land and water they are nothing. Land and water are unalienable from their sense of identity and being. The view has been expressed many times that until the science is certain and the research completed in this particular industry, the coal seam gas industry, the risk to their traditional land and waters is simply too great. Native title rights and interests cover a number of areas: the future acts that come under native title rights; the ILUAs, which are the Indigenous Land Use Agreements; and cultural rights. There a number of recommendations that we would like to put to the Committee. With your indulgence, Mr Chair, I will go through a couple of them very briefly.

CHAIR: Yes.

Mr MUNDINE: The typical native title rights and interests are the right to hunt, fish, gather, erect temporary shelters, enter and remain on land, undertake ceremonies, protect certain sacred sites, et cetera. These rights are granted over Crown land, rivers, travelling stock routes, national parks and State forests, for example. It is of particular concern to us in regard to a pipeline that could be utilising travelling stock routes. This would affect traditional owners' access to travelling stock routes and required cleanings around methane gas for fire hazard purposes could also prevent any other functionality of a travelling stock route and remove them from the common good. This also would severely impact on the native title rights and interests. Coal seam gas activities will further limit access to Crown land and forests, which are subject to native title rights and interests as well.

Exploration has been occurring in the Pilliga State Forest in north-western New South Wales for many years and current developments proposed by Eastern Star Gas will see the development of a major gas field in the area, primarily within State forest. These acts are future acts and involve procedural rights for registered native title holders. NTSCorp strongly suggests that a policy of free, prior and informed consent is adopted in discussions and consultations with traditional owners. A future act is an act carried out after 1 January 1994 that affects native title. The Native Title Act contains procedural rights that ensure that future acts are carried out validly. The strongest form of procedural rights is the right to negotiate. This is given to registered native title claims for the following type of future acts: the grant of exploration licences, mining leases and some compulsory acquisitions.

These are the things we would like to raise with the Committee today. The other one is the Indigenous Land Use Agreements, which are voluntary agreements made between a third party and traditional owners about any matter concerning native title rights and interests and the use and management of land and waters. ILUAs, as they are commonly called, can be negotiated with any traditional owners regardless of whether or not there are native title claims and can provide the basis for a constructive relationship between traditional owners and other parties with an interest in lands. ILUAs can provide a framework for negotiating issues that may not be covered under the future acts regime. In fact, we recommend it is a good way of moving forward in a number of issues.

Traditional owners may have rights under New South Wales legislation of private arrangements concerning cultural rights with freehold owners to access and use land for cultural purposes, including hunting, collecting food and medicines, performing ceremonies and other traditional cultural practices. For traditional owners this is a strong and very important part of their culture and activities and can be worked out very simply through negotiations and working together. In fact, under the National Parks and Wildlife Act in relation to the cultural rights of Aboriginal people, they need to be consulted and worked with on any developments that are going on.

I refer now to the fundamental principle of Aboriginal economic development and cultural sustainability. This refers to the ability of Aboriginal people to maintain cultural identity whilst successfully operating in the mainstream economy. NTSCorp has submitted an expression of interest to be included in the Government's border reform cultural and heritage working party. We feel that a peak Aboriginal body in New South Wales is an appropriate inclusion. We believe that the onus is on government and proponents to appropriately engage traditional owners to conduct heritage surveys to identify all potential cultural areas that may be affected by the coal seam gas industry and that cultural awareness training is necessary for stakeholders to work closely with affected traditional owner communities.

The recommendations that we would put forward to the Committee are: improved consultation and communications. In fact, this is one of the failings of what has been happening so far within the coal seam gas industry, that is, proper engagement when dealing with traditional owners. The way they can do that properly is through consistent notification of traditional owners and NTSCorp as the service providers for New South Wales and the Australian Capital Territory for native title by the New South Wales Government. A further recommendation is compliance with the framework in the Native Title Act to ensure traditional owners can exercise free, prior and informed consent for determining and developing priorities and strategies for the traditional owners.

They need to engage traditional owners in the development of policy and the implementation of programs and commercial practices affecting traditional owners' lands and begin at the start of the projects, not at the end. Further recommendations are: minimise adverse impacts by taking the differing health needs of Aboriginal communities that will be directly affected by coal seam gas activity; recognise the environmental impacts of coal seam gas exploration and extraction on Aboriginal people's ability to live traditionally and off the land; and conduct cultural practice in accordance with traditional law and custom and undertake the appropriate research accordingly.

Another thing is to fully realise the employment benefits from the coal seam gas sector. A partnership between the Government, industry and community to develop integrated strategies is likely to yield the best result. These strategies must address education and training, career progress and mentoring, and ensure that Aboriginal employment is not limited solely to field work but provides opportunities for staff to be trained for managerial positions and that local traditional owners are prioritised to receive opportunities.

We are not anti the coal seam gas industry, as we are not anti any economic opportunities that come into the State of New South Wales. What we want is proper processes where traditional owner groups within New South Wales are engaged. The companies across New South Wales, across Australia, have found that by going through those proper processes they get the outcomes that they need that benefit the State. We look at coal seam gas as we look at the development of the coal industry throughout New South Wales: as economic development opportunities but economic development opportunities within certain boundaries. If they meet the environmental issues, they meet the protection of cultural heritage, then working with Aboriginal communities, we see that as a big plus for the State and a big plus for those industries.

We note that industries across Australia, even if they are not involved in the coal seam gas industry or extractive industries of mining and so on, have realised that by working with Aboriginal people, traditional owners, working through employment strategies and so on they have a massive outcome. You only have to look at the Mineral Council of Australia's latest statistics where at least 5 per cent of the mining industry nationally is now Indigenous. We are employment contracting in a number of other areas. There is a push to get that to 9 per cent. On individual mine sites around the country you see figures of 27 per cent to 28 per cent, nearly 30 per cent, of Aboriginal involvement through contracting and through employment and working with those mine sites. You are now seeing the development of large Aboriginal companies like Ngarda in Western Australia, which has a \$200 million annual turnover working within those industries. For Aboriginal people—I know some people like to paint us into a corner of being anti development, anti mining and anti coal seam gas, but in fact we are not, as long as it is happening within certain frameworks.

CHAIR: Is the Native Title Services Corporation a State-based organisation?

Mr MUNDINE: It is State based. We are funded by the Federal Government and carry out those activities within the State. We do some research work in other States like Western Australia and the Northern Territory but our major work is in New South Wales and the Australian Capital Territory.

CHAIR: Because the coal seam gas industry in New South Wales is a relatively new industry, do you have the opportunity to put forward to the Committee any positive models from your interstate parallel organisations that could perhaps inform the Committee for its recommendations in regard to what is best practice? What is the best practice and what examples that demonstrate that best practice, although they may not necessarily be in New South Wales at the moment?

Mr MUNDINE: The best practice across the country at the moment is where groups, companies, developers are engaged through the native title peak bodies working with the traditional owner groups, and through that process of sitting down and negotiating and having conversations you will note that the outcomes that happen are of benefit to the company. They get their activity happening. They get the support of the Aboriginal community in regard to those activities happening, and it crosses across a wide range of areas. I will pick a very contentious issue like uranium mining.

You will find in South Australia and in Western Australia the uranium companies have sat down and worked with the native title representative bodies, sat down with the traditional owners through the representative body community consultation process, and they are getting outcomes and you see the expansion of that industry. That is in a very contentious industry. I think coal seam gas, if I read the media right, is in the same boat as that at this stage. So I think if the coal seam gas companies want to work with communities, I think by sitting down with Indigenous groups, the traditional owners, through their representative body—in this case it would be the NTS Corporation—they can negotiate some very good outcomes.

CHAIR: Has the Native Title Services Corporation had any preliminary discussions with the peak body of the gas operators, the APPEA?

Mr MUNDINE: No, we have not at this stage, but we have had meetings with some of the companies on a one-to-one basis. We want to now continue those conversations, with outcomes coming from those conversations of how they will work for the benefit of those communities that they are working with. In fact, I am catching up with the APPEA on I think it is Wednesday and having a conversation with them.

The Hon. Dr PETER PHELPS: Have you come across any other ALC that has said, "Absolutely not. We just don't want it."?

Mr MUNDINE: There are some traditional owners who do that. As you can imagine, they are like the wider Australian community, the New South Wales community—they have differing views on that. The majority of the views at this stage are that they are not so much anti it; they are just concerned about it, mainly because, first, it is new—it is a new operation—second, they have seen what has been going around the media, and, third, there has not at this stage been proper consultation with them. Once we get those things in place and we can go through those proper consultations and we get the science on the ground, then I think people will be a lot happier.

The Hon. Dr PETER PHELPS: In your view would it be the role of the Government, for example, to provide independent scientific advice as part of that process?

Mr MUNDINE: I think helping provide that independent scientific advice would be a help. Also I think we need to not get too carried away about the language of the science. I suppose I should put in my disclaimer. My background is that I came out of the gas industry. I worked for AGL in the past and GasNet and a number of other companies as well. We need to get able to get into a language and in a presentation that people can understand and work with. I have no doubt that if the industry wants its projects to go ahead, sitting down and having proper consultation with the traditional owners and presenting the evidence and the environmental and the science of what they are doing, then you will have a proper conversation.

The Hon. Dr PETER PHELPS: I want to take up that point because I think the distinction has to be made clear. Many people have come before this Committee saying that they do not trust the companies themselves to give them the real deal about the effects and the concerns that people have about the environmental issues. Do you believe that simply leaving it to the companies is good enough for the science? I certainly accept your argument in relation to dealing with local owners in relation to access agreements, no-go areas, employment and the like. I am looking more at the assurance in relation to the safety or otherwise of coal seam gas.

Mr MUNDINE: I think the industry is their own worst enemy. I think the way they have approached it—

The Hon. Dr PETER PHELPS: While the Hon. Jeremy Buckingham is alive they are not.

Mr MUNDINE: They have not properly approached the traditional owner groups so that has caused a mistrust that they have to deal with now. Having that mistrust and then presenting their case with the science will be a bit of a problem when that mistrust has already been put in place. They will have to do a lot of work on that area.

The Hon. SCOT MacDONALD: In your submission you state, "Traditional owners have the right to benefit from the exploitation of all natural resources on their country, including coal seam gas". Have you got something specific in mind? You have talked about employment and that sort of thing. Do you have anything else to suggest?

Mr MUNDINE: Those type of things are much a given nationally now. You will find that within the mining and extraction industry, within the energy industry, these are much givens in regard to employment opportunities and economic development, and economic development covers a wide range of things, as you can imagine.

The Hon. SCOT MacDONALD: But not a royalty is what I think I am getting to.

Mr MUNDINE: No. What we would like to do is first have the engagement, have those conversations and have a look at what those economic development benefits can be. It could be a range of things. It can be just employment, it can be looking at contracting arrangements, it can be looking at a number of opportunities that could happen.

The Hon. Dr PETER PHELPS: Community service obligations, things like that.

Mr MUNDINE: There is a whole range of things that can be put in those packages. If you look at the recent launch of the Mineral Council of Australia's Indigenous economic strategy for the next five years you will see a number of ranges of things that could be happening, which the Mineral Council and the larger companies have signed up to.

The Hon. SCOT MacDONALD: Have you got any recorded problems of conflicts with cultural heritage as the exploration has rolled out?

Mr MUNDINE: For us there have been some problems. One is trying to bypass what we call the native title process and not properly consulting and engaging with Aboriginal people, trying to get winners by going into individual communities and picking out people and trying to work with that. That surprises me. I worked in the gas industry for a number of years. That is like 15 years ago. The mining industry has moved far and above that now.

The Hon. Dr PETER PHELPS: Was that instance in New South Wales or in Queensland?

Mr MUNDINE: I cannot talk about Queensland. I am just talking about in New South Wales where we do have incidents where some companies have ignored that process. We are starting to pull them back now and have that proper consultation. If I have something to say to the mining industry or the coal seam gas industry and to other mining companies in New South Wales it is that you have a group of people, traditional owners in New South Wales, who are quite willing and happy to see economic development happening and see the benefits of that not only to themselves but to the wider New South Wales community and what can happen in those areas. But they have to be treated properly and they have to be consulted and they will be surprised with those conversations.

The Hon. JEREMY BUCKINGHAM: I would like to flesh out the issue around the Indigenous land use agreements [ILUAs] and where you have seen models that have worked. I think it is fundamental to gaining the acceptance of the Aboriginal community that there is a framework in which that can happen. It would be instructive for the Committee to know of any examples of where that has been better implemented?

Mr MUNDINE: ILUA is probably the best way to go because we can put into a basket a pool of things. For instance, I have worked on projects where you put in protection of cultural heritage so there is a process that is put in place. I will give you an example of a lineal project, a gas pipeline project which will happen in this, the coal seam gas program will have lineal projects like pipelines. Pipelines are moving at a very quick pace across the country. You are moving to six kilometres, to 18 kilometres a day depending on the speed of the construction work.

So in that ILUA process you would put a framework where when they come across cultural heritage significance, when they clear land and they have a look at things, that the proper procedures for that to be dealt with and how things are done. That is a good example. If you are doing a lineal project your project could come to a screaming halt and that could cost you a lot of money on a daily basis. With ILUA processes I have seen where they put in place where projects can deal with that and move forward and it satisfied the Aboriginal community and it protects their cultural heritage as well as it satisfies the company in regard to its economic issues. That is just one example of some things that are not necessarily economic. We can have a spin-off in other ways.

The Hon. JEREMY BUCKINGHAM: Another interesting element of your organisation's submission is how we minimise adverse impacts of possible future coal seam gas operations on surface and groundwater, and your representation that the aquifer interference regulation, which is in draft form at the moment, has no specific protection for native title right. Could you expand on that a little bit? Is it the strategic regional land use reference group working that up? Are they working on the aquifer interference regulation, or what mechanism is being used to engage with the Aboriginal community when it comes to the aquifer interference regulation and what would you like to see come out of it?

Mr MUNDINE: I will deal with that issue up-front but it seems to be a trend across a number of areas in New South Wales. To be fair, it is not a particular issue of this Government, it has been an issue of previous Governments as well about the treatment of the rights of Aboriginal people and traditional owners in New South Wales. There has not been a very good process put in place with that. We want to see through these legislation approaches and these conversations that there is a process put in place where the native title rights of Aboriginal people are recognised and that they are dealt with in a proper process through negotiations and consultations.

In looking at the benefits that can come out of that it is not only for Aboriginal people, because you are moving Aboriginal people into jobs in other areas and that has a statewide benefit as well for the people of New South Wales. Our major concern is that that is not the case. As you know from the native title legislation, we do

not get veto rights on these projects now but we do want people to show the respect of actually having a conversation with us and working on the issues. Cultural heritage is a good example of that in that everyone tends to think of it as Indigenous cultural heritage. Yes, it is Indigenous but it is New South Wales and Australia as well. It is a heritage that goes back thousands of years and it is part of Australia and New South Wales heritage. It is not just about Aboriginal people looking after their heritage; it is about Australians looking after their heritage as well. We have got to approach it from that angle. The major issue for us that I keep banging on about is that they need to be looking at how they should be consulting and working with Indigenous people to bring out the benefits.

The Hon. JEREMY BUCKINGHAM: In relation to cultural heritage which I suppose is more in terms of Aboriginal Australia and its significant heritage, you have said in your submission that cultural heritage monitoring should be an ongoing process rather than, I assume, a one-off. With huge projects over large areas in places like the Pilliga, Narrabri, Moree and Boggabri you would expect to see millions of potential artefacts in those areas. What do you mean by ongoing? My experience has been that there is a survey done at the beginning of some projects and it is left there. Can you expand on that point?

Mr MUNDINE: You are correct that it is usually done up-front. They do surveys that start from desktop surveys and then they go out and do fieldwork. Then a report is produced and that is usually about the finish of it. In linear projects they are ongoing. In those projects because you are continuing clearing land and going through things you come across discovery processes. In those types of projects they do have an ongoing monitoring operation that happens with checking of things, making sure that they do cover those cultural heritage protection areas and making sure they have processes in place for that to happen.

What we are saying is it should be carried out across a number of areas because where you are digging and clearing land in the initial surveys—and I have found this on every project I have worked on and I have worked on 29 gas pipelines and five mines across Australia—we have always come across other stuff and found other stuff in those projects. So that is what we are talking about. The good mining companies, the good mine sites, the good linear projects have always had a person employed who deals with those issues as an ongoing process.

The Hon. GREG DONNELLY: Thank you, Mr Mundine, for coming along this afternoon. Congratulations on a very good submission which is helpful to this inquiry. My first question goes back to the extractive gas mining industry which predates the emerging coal seam gas industry. Obviously there have been fields like Moomba and others that have extracted gas for local consumption. Looking in retrospect at that industry, are there lessons to be learnt? I know we can and must distinguish coal seam gas exploration and mining from that type of gas exploration and mining, but given we are talking about extracting gas from the ground and utilising it domestically and perhaps even exporting it, are there lessons both good and bad that we can take from the extractive gas industry that has operated in the past in Australia?

Mr MUNDINE: I think you can. The natural gas and other gas operations do well predate even native title law and everything goes back a number of years. The lessons that have been learnt out of that are quite numerous. I do agree that there is a significant difference between coal seam gas and natural gas as well. The first issue is that the gas industry, people like AGL and another company I worked for, very quickly picked up on the fact and were well in advance when dealing with Indigenous communities and the operations of Indigenous communities. They started putting in place employment opportunities, economic opportunities, cultural heritage protection and a wide range of issues well in advance of other companies. A good example of that was some of the initial pipelines that came into the Northern Territory. From day one they actually engaged Indigenous groups in the design, the layout, the route of those pipelines and the work they were going to be doing. So I think there are a lot of lessons from that.

The Hon. GREG DONNELLY: Do you have a view about why that particular company approached it that way?

Mr MUNDINE: There was that company and a number of other ones. They looked at it that they were intruding on people's land. They saw themselves as providing a benefit and we all agreed they were providing a benefit, an economic benefit as well as a community benefit by access to gas for cooking and other things. They saw that they needed to work very closely with the community in those regards, so they always were very mindful about engagement and conversation.

They also felt that they did have a corporate-social approach. In the past projects just passed over Aboriginal land, nothing was really done for those communities that were there. So they went out of their way to ensure that employment opportunities were created and that there was protection within certain arrangements with those Aboriginal communities. That is how they did it. So it was not about no, you cannot touch any cultural heritage activities. Of course when you are extracting or when you are making an easement you do interfere with certain areas. But it was the way they approached that, how they set up structures for that to happen and those conversations. They did win a lot of people across and people were very happy to work with those companies.

The Hon. GREG DONNELLY: Just forget the particular company for the moment and let us take the principles underlying what you have said as an example of what appears to be best practice, if I can use that phrase. Considering the way in which the coal seam gas industry is starting to develop in New South Wales and various companies and subcontractors of those companies coming in to do the work, are you able to make an observation that what is emerging is good practice in New South Wales, not good practice, or 50/50?

Mr MUNDINE: We are not happy at this stage. There is a reason why a majority of people in Aboriginal communities in New South Wales are not supportive. One is the way it has been approached, or not approached, I should be saying, about how their involvement should be. The proper processes is working through the representative bodies of those Aboriginal communities and dealing with it that way, rather than trying to pick people out of the communities. Another reason is the way that they have built mistrust within those Aboriginal communities at this stage. There are a number of concerns of course just putting the environment stuff to the side, but then you bring the environment back into it and there are a number of concerns there. I think it is up to the companies now to correct that and start building that process better.

The Hon. GREG DONNELLY: This might seem like a naive question, but from your organisation's point of view how do you submit they should go about starting to rebuild that trust?

Mr MUNDINE: The first thing is they need to come back and deal with the representative bodies of those people and have that conversation there, because it is a complex issue. As we said, it is new in New South Wales. The coal seam gas industry is new. The science is new on a number of issues. People need to be properly engaged, given proper information and independent information so they can make proper and independent decisions.

The Hon. GREG DONNELLY: The recommendations in your submission talk about the importance of employment opportunities. I think that speaks for itself. In terms of tying that in with educational opportunities for Indigenous communities, could you give us some insights into examples that you have firsthand knowledge of where companies have been thoughtful in the way in which they have been creative in developing educational opportunities for Indigenous communities?

Mr MUNDINE: It is a very bizarre thing for me to come and make these comments because if you look at the history of the mineral industry and the mining industry and Aboriginal people you can see two people who have a history of clashing together because of the way the mining companies and the mining industry operated. But in the last 15 years they have picked up their game. You see a number of things where mining operations now look at employment opportunities and engaging people. Where the skill base is not there they put in place training programs, skilling-up programs and mentoring programs within those communities. Looking at joint ventures you see a number of subcontractors working with Indigenous businesses and trying to build those businesses. Of course this depends on the scale of operation: the larger the scale the better these opportunities.

Then you have a look at some of the educational programs and trust arrangements that have been set up working for Indigenous groups. There are quite a number of them. The whole basis of that is in regard to education. You will see that some of the larger companies now invest a lot of time, money and resources into Indigenous education for a number of different charities and organisations out there, as well as within their companies. I praise them for the work that they do. There are some groups of companies that are still not doing that and need to pick up their game in this area. I think coal seam gas needs to be focusing on and looking at this.

CHAIR: Mr Mundine, it appears to me from the evidence you have given and from looking at your submission that the nub of the problem is contained in your statement that the New South Wales Government is currently not fulfilling their obligations, specifically in relation to the notification of relevant bodies and

traditional owners. We have heard evidence more broadly from the community that they feel the notification of exploration licences, for example, which are where it all starts, is hit and miss. A notice is put in the paper, usually the *Land* or something like that, the area is shown and it is sometimes difficult to ascertain where that area is. Could you offer a recommendation to the Committee as to how you feel that problem could be solved? For example, do you feel it would be helpful if on the granting of an exploration licence the applicant was notified that they should contact your organisation to ascertain which groups might need to be consulted in future, or do you think it is better for your organisation and for the people you represent that your organisation is notified on each exploration licence and who the relevant persons are?

Mr MUNDINE: My recommendation would be on the latter. That is our bread and butter: that is what we do for a living. If you sent notifications they may not be presented to us. We know that quite a number of notifications are not sent to us and there is a history of that. We have to do catch up and then the project is held up and there are problems and then mistrust develops in that process. There is us and the NSW Aboriginal Land Council which has that network as well. We should be notified and then we can go through the notification process with our clients.

I will tell you how good some of our processes are. Everyone talks about connection to the country and clarification of who are the right people. For the last 10 years we have had a research team of six people and that is what they do every day of the week. They have been able to track people back four, five or six generations. Not only that they have been able to tie them to country and which part of New South Wales they have come from, their families and their relationships. The project has been going for about 10 years. Taking the north-west area around Gunnedah and Moree, which is Kamilaroi country, I have two buttons on my computer at work and I can tell you how many living Kamilaroi people there are, where they live, their phone numbers and about their children. That is the sort of research we do.

CHAIR: The corollary of that of course is that is a resource that the Government could use.

Mr MUNDINE: They could have access to it.

CHAIR: All that would be needed would perhaps be a change to a regulation to make it incumbent on the body issuing the licences to take the first step and notify your organisation.

Mr MUNDINE: That is all they have to do. One of the big things in this game of cultural heritage and dealing with traditional owners is certainty. We can guarantee that certainty.

CHAIR: Thank you for giving us your point of view and your recommendations. I can assure you we value them.

(The witness withdrew)

JAMES DAVID CAMERON, Chief Executive Officer, National Water Commission, affirmed and examined:

CHAIR: Would you like to make a brief opening statement?

Mr CAMERON: I will keep it brief. The National Water Commission [NWC] is pleased to be here to provide evidence to this inquiry. The National Water Commission was established in 2004 pursuant to the National Water Initiative, which is an agreement between the Commonwealth, State and Territory governments on water reform across the country with the objective of achieving sustainable water management through a system of compatible planning, regulatory and market structures across the country.

The commission's role is to facilitate that reform process by reporting to Australian governments and the public on their performance in the delivery of their reform commitments under the National Water Initiative, by providing advice and strategic analysis on emerging water issues and by supporting projects to improve information and management tools available to water policy decision-makers and managers. The National Water Commission issued in December 2010 a position statement on coal seam gas and water as part of its strategic advice role and sought to highlight the opportunities, the challenges and the risks of coal seam gas development for sustainable water management in Australia.

In that position statement we set out a set of principles that in our view should guide the management of water impacts through coal seam gas. More recently, in September 2011, the commission released its third biennial assessment of water reform across the country and provided further updates on management of coal seam gas issues in both Queensland and New South Wales. The commission has provided through our submission a position statement to the Committee to assist its deliberations and I am happy to take any questions.

CHAIR: In your submission you list a number of potential risks. Does the commission believe these are only potential risks or does it have any evidence to support those dot points being fact? I will give an example. You say that "extracting large volumes of low quality water will impact on connected surface and ground water systems, some of which may already be fully or over-allocated, including the Great Artesian Basin and the Murray-Darling Basin". Am I right in assuming that that is just a highlight of a potential risk or do you have evidence that that has in fact occurred?

Mr CAMERON: Coal seam gas developments, particularly in New South Wales but even in Queensland, are still at a relatively early stage compared to the fully approved levels of development. At the fully approved levels there will certainly be reasonable significant amounts of water extracted particularly in Queensland. That extraction process has the potential to depressurise groundwater systems, which has an impact on other systems that are used by third parties—agricultural users and regional communities. The bringing of that water to the surface will require the management of co-produced water, which again potentially involves the discharge of that water into surface water systems or other impacts that have the potential to affect other associated systems.

CHAIR: So perhaps the expression "extracting large volumes of low quality water will impact" should read "may impact". Have you any evidence that you could bring to the table to demonstrate where that has occurred, for example in Queensland?

Mr CAMERON: It is certainly the case in Queensland. For example, the extraction of water from coal seam gas is lowering the levels of groundwater systems and some of the proponents there are making arrangements to compensate for the impacts of those activities. I do not have the particular examples in front of me today but it is certainly true that the extraction of that water will impact on groundwater systems.

CHAIR: Would you be able to provide the Committee with some documentation to support that?

Mr CAMERON: I will take that on notice.

The Hon. RICK COLLESS: In the opening statement in your submission you refer to the approximate figure of 300 gegalitres per year that is likely to be extracted. In the Murray-Darling Basin you refer to the 540 gegalitres per year of the approved extractions. Is that 300 gegalitres a year water that would not normally be utilised by agriculture or be available to or of sufficient quality for agriculture or domestic purposes?

Mr CAMERON: To clarify the figures, the 540 gigalitres is the current estimate of use of water in the Great Artesian Basin not the Murray-Darling Basin. The water which is extracted in the process of producing coal seam gas normally comes from the coal measures themselves and in most cases that water is of relatively low quality and could not be used without treatment for agricultural or other purposes.

The Hon. RICK COLLESS: If that water was extracted and treated obviously there would be a residual amount, but let us assume that 70 or 80 per cent could be treated to sufficient quality to be used for agriculture, stock and domestic use. Does that not represent an extra 300 gigalitres of good quality water that could be put into the system?

Mr CAMERON: It certainly is the case that that water can be treated and the treated water can be used for agricultural or domestic purposes. In that sense the commission has presented the view that where that is the case the water should be the subject of entitlements as with all other water extractions in the system, which would not only mean they are taken into account in the whole-of-system management of the resource but also the coal seam gas producers could trade the water in the market alongside other operators.

The Hon. RICK COLLESS: The government representatives earlier today gave us an indication that that is the case: they would be treated exactly the same as any other water extraction.

Mr CAMERON: It should be noted that the process of extracting that water will depressurise those systems and has the potential to impact on other aquifers so there may not be a gross increase in the amount of water available.

The Hon. RICK COLLESS: That is where I was going with my next question. In your series of dot points under potential risks to sustainable water management, when you talk about the depressurisation of aquifers does that not suggest there is a leakage of water from higher aquifers into those coal seam aquifers?

Mr CAMERON: That may be the case; it is not necessarily the case. The coal seams themselves would be depressurised. The impact on other aquifers will depend on the level of connectivity between those aquifers and the coal seams themselves and whether that connectivity is either created or enhanced by the process of depressurisation. It has the potential to impact on adjacent aquifers but that depends very much on the circumstances of the systems, case by case.

The Hon. RICK COLLESS: The industry people have told us that if there is leakage of adjacent water supplies into the coal seam itself it is more than likely going to render that particular coal seam unsuitable for gas extraction because they will not be able to dewater it efficiently. I am a little confused about where you are coming from by suggesting there is that interconnectivity whereas the coal seam gas people are telling us if that interconnectivity exists it is likely that particular coal seam would not be economically viable for them.

Mr CAMERON: I have not heard that comment from the industry and I would not be able to comment on the economics of those particular cases, but the commission has articulated its position on the basis of the advice and information it has available to it. Our understanding is that there is real potential for there to be circumstances in which depressurisation of one aquifer will impact on others.

The Hon. RICK COLLESS: What has been the impact of the depressurisation of the Great Artesian Basin aquifers on aquifers that lie above it?

Mr CAMERON: Are you talking about coal seam gas developments specifically or more generally?

The Hon. RICK COLLESS: Correct me if I am wrong, but it is my understanding that the Great Artesian Basin is much deeper than the coal seam gas aquifers.

Mr CAMERON: The Great Artesian Basin is a significant and geographically extensive and complex system of aquifers. The coal measures themselves, particularly in Queensland, are generally above the Great Artesian Basin and above them are generally more shallow aquifers—

The Hon. RICK COLLESS: Better quality water.

Mr CAMERON: —essentially in the Murray-Darling Basin. It is certainly the case that the extraction of water from parts of the Great Artesian Basin creates a lowering of pressure in particular areas and that has the potential to draw water from other parts of the broader system.

The Hon. RICK COLLESS: You comment that there is a risk in releasing overly treated clean water into natural systems. I find that quite interesting. We have heard that comment quite a few times in different submissions. It seems incongruous to me when we live in an era when there is far more concern about poor water quality that it is being suggested putting in better quality water will reduce the water quality rather than improve it.

Mr CAMERON: The release of treated water into natural systems would generally be undertaken as part of an environmental flow with the potential to replace natural environmental flows. Natural water, in many of these river systems, has biotic and other material in it that is part of the broader environment in that water. Treated water from reverse osmosis is extremely high quality water and so the process of putting that into natural systems, particularly where there are circumstances of low flows or during periods where flows would otherwise be ephemeral, has the potential to impact on the environmental condition at the time. So, it is a comment on the quality of the water that is naturally within those surface water systems.

The Hon. SCOT MacDONALD: Mr Cameron, I want to ask you about your widely-quoted comment: "It risks having significant long-term, and adverse impacts on adjacent surface and groundwater systems." Most people who quoted that did not quote the first part of the sentence but that is another matter. The dilemma we have is, we are told that if we do not do the exploration and we cannot get the data, the figures, the hydrology, the things Mr Colless was talking about, then we cannot get the evidence to manage the risks. Have you considered how this dilemma can be approached, without exploration?

Mr CAMERON: I can say clearly that the Commission is not arguing that there should not be exploration of coal seam gas. In fact, we are not arguing that there should not be the development of the coal seam gas sector. The Commission has argued that a precautionary and adaptive management approach should be adopted. What that would suggest is that, where exploration approvals are made, they are to be made on the basis of careful consideration of the likely impact of those developments and activities, with appropriate decision points and thresholds identified about the circumstances in which, if those activities create outcomes that were unanticipated, management arrangements can be adapted to address those concerns. It is certainly the case that full development activity should be undertaken on the basis of the best available science and that will require a reasonably high level of scientific understanding of the systems that are being proposed to be developed and also a careful and transparent articulation of the management arrangements that were to be applied in those circumstances.

CHAIR: On page 2 of your submission, under the heading "The Commission's Work on CSG", you say:

The Commission is completing a discussion paper on CSG water issues and potential impacts to provide useful background information for regulators, water managers and other water users.

Mr CAMERON: They are different projects. In fact, the first paper referred to in that statement has since been released by the Commission. It is on our website and we are happy to provide the Secretariat with the details, if you wish.

CHAIR: The second one, the Potential Local and Cumulative Effects of Mining on Groundwater Resources project, when is that due to be completed?

Mr CAMERON: It has been completed and is on the website.

The Hon. JEREMY BUCKINGHAM: Mr Cameron, have there been any examples outside of the coal seam gas industry of which you are aware where there has been extraction from a deep aquifer that has led to a depressurisation and the lowering of volume and pressure in adjacent aquifers? Is that a process that has occurred in other areas?

Mr CAMERON: I cannot point to specific examples but it is the case that where aquifers are connected with other aquifers or significantly also surface water systems, that the extraction of water from one aquifer, a lower aquifer in particular, has the effect of changing the pressure within both aquifers, meaning that water can transfer between those aquifer systems. I do not have examples in front of me but I would certainly be able to point the Committee to an analysis which has shown that to be the case.

The Hon. JEREMY BUCKINGHAM: Could you take that on notice to provide the Committee with any relevant research documentation of such processes?

Mr CAMERON: Certainly in terms of the cross-linkages between aquifer systems, we take that on notice.

The Hon. JEREMY BUCKINGHAM: In your submission the National Water Initiative agreements are a key consideration and you talk about the fact that it is not well integrated—you have the Mines and Works Inspection Act, the Environment Protection and Biodiversity Conservation Act 1999 and the local regulations and legislation. How do you think it could be better regulated? Should it be within the jurisdiction of the Federal Government entirely to oversee the planning for such large projects? What is the Commission's recommendation on how better to integrate the mineral, petroleum and other industries?

Mr CAMERON: The National Water Commission is a body created to promote the National Water Initiative and the National Water Initiative recognizes that water is fundamentally a responsibility of State governments, with the exception of the particular arrangements that have been put in place in relation to the Murray-Darling Basin, as a result of agreement between those relevant States and territories. Similarly, the development of the mineral and extractive industries sectors, is primarily the responsibility of the States. From the National Water Commission's perspective, we have argued that the sustainable management of water resources as a whole requires that all significant users of water within a resource area are subject to a management and entitlement framework which is consistent with the National Water Initiative.

There is a range of water uses that are not yet fully integrated into NWI-consistent planning. Management arrangements differ in different States but, for example, mining developments, coal seam gas developments, commercial forestry and other water inception activities often occur without the requirement for full licensing and management through NWI-consistent arrangements. In our view, the objective should be to bring any significant water user within that sort of arrangement. In New South Wales we do see steps being taken requiring the licensing of water extraction and coal seam gas developments through the water management arrangements. From the Commission's perspective, we will be looking with interest to the final aquifer interference arrangements that the Government will release in draft and then in final form, to see how that brings the management of the physical impacts of aquifer interference activities into the broader water planning and management system.

The Hon. JEREMY BUCKINGHAM: I see that the Commissioner has commissioned a \$1.8 million study, the Potential Local and Cumulative Effects of Mining on Groundwater Resources Project. It is "developing tools and guidelines to account for potential local and cumulative effects". When will that be delivered? What are the terms of reference? Is it going to capture coal seam gas and what is the delivery time on that resource?

Mr CAMERON: That resource has been completed. It is a project which was conducted with a particular focus on the mining sector, so it does not explicitly or specifically deal with coal seam gas development but certainly some of the underlying principles and models that have been developed there have potential benefit for application to coal seam gas areas. That project has been completed and the resources are available. The project sought to develop an analytical model and a set of software tools which will enable water managers to look at the potential cumulative impacts of multiple mining industry developments in a particular area, drawing on a range of different information resources and being able to apply that in a way that identifies the relative risks of those sorts of developments.

The Hon. JEREMY BUCKINGHAM: Given the sense and the obvious application of that model, is there any plan to modify or develop that for coal seam gas?

Mr CAMERON: The Commission does not have any specific plans to do that. We are continuing to work with the Minerals Council and talk with the Minerals Council of Australia about the further development of that tool and the trialling of that tool for operation in the minerals sector. The Commission itself has a sunset clause of June next year. We are an organisation currently under review, so our work program beyond June next year is a matter which will depend upon the outcome of that review process.

The Hon. JEREMY BUCKINGHAM: You also say that:

Adequate monitoring, including baseline assessment of surface and groundwater systems, should be undertaken to provide a benchmark for assessing cumulative impacts on other water users and water-dependent ecosystems.

What is the Commission's view of the level of monitoring baseline assessment that is being enacted here in New South Wales?

Mr CAMERON: I think the Commission would, at this point, be reserving its judgement on that issue in awaiting the development of the aquifer interference arrangements. They will be the mechanism by which the Government seeks to understand the current aquifer characteristics and the likely impact of those sorts of developments and the mechanism by which those regulatory arrangements would be put in place. Certainly, from our perspective, we have called for transparency in the development of those arrangements, the publication and public availability of the assessment of the relative risks and impacts and clear accountabilities to be put in place to determine who is responsible for managing impacts where they occur, including those that might be unanticipated. The Commission has called for clear decision points and thresholds for the ongoing management of interference activities, particularly where the monitoring identifies that impacts are going beyond acceptable thresholds.

The Hon. JEREMY BUCKINGHAM: Further in your submission it deals with accountabilities and you are suggesting that full costs, including externalities of any environmental, social or economic water impacts and their management should be borne by the coal seam gas companies and that those accountabilities should be identified for any short- or long-term cumulative impacts. Further on you say that "a precautionary and adaptive approach to managing and planning for CSG activities is essential". It has been a criticism from a lot of groups that adaptive management is not the proper framework for this industry.

I will give you the example of how they are or are not dealing with the issue of salt in Queensland. An enormous amount of salts—a pretty broad term, "salts"—a lot of minerals and compounds that are being removed from the produced water, and yet it is unclear how the industry is going to deal with those salts. We have had testimony last week from a water scientist who was saying that aquifer reinjection could be a risky process, that dealing with those salts and finding a market for those salts is unlikely to happen. So that is adaptive management, because they have moved from evaporation ponds to reverse osmosis and we have this adaptive approach. Could you expand on why you think an adaptive approach is the best? Should not we be coming up with a strict regime, with thresholds and accountabilities and measurements to manage what could be a massive industry?

Mr CAMERON: What the Commission has argued is that we need both a precautionary and adaptive management approach and I think that recognizes two things: That in some circumstances there may well be identified developments where the risks associated with those developments are significant and that the onus of the burden should be on the developer to provide a level of confidence that development can occur without any unacceptable impacts. That is the basis of the precautionary principle. There are other aspects of developments or other areas in which developments may take place where the level of risk is lower and an adaptive arrangement is more sensible. Thresholds of acceptable impacts are identified. There is clear accountability for who has responsibility for those impacts, and clear mechanisms for decisions to be made and management arrangements to be made in circumstances where impacts might occur outside those acceptable principles.

I am certainly aware of concerns that people have raised about salt management in Queensland. I am not sure that I would articulate that as a predefined and established adaptive management regime. What we have seen is a set of arrangements, and then changes to decisions about how salts should be managed on the basis of both commercial decisions by the operators but also some regulatory changes of government. That does not represent a predetermined adaptive management regime, which identifies the thresholds, identifies decision points and has in place clear mechanisms to monitor impacts and deal with both acceptable and unacceptable impacts over time.

The Hon. GREG DONNELLY: Could I take you to page 3 of your submission, starting at page 2 and going over to page 3, where you set out some principles. The second dot point relates to aquifer reinjection. I am not sure whether you have specific knowledge of this area but, with respect to aquifer reinjection, can you elucidate for us what it means and what its potential impacts are? We have a general understanding that aquifer reinjection means pumping water back down into the aquifer under pressure. But, if you have some background and knowledge, could you explain a bit about it? Are there examples of other underground mining activities where there has been a similar reinjection of waters, either domestically in Australia or overseas, to help me understand it a bit better than I do now?

Mr CAMERON: I should start off by saying that I am not a technical expert, so I am unlikely to be able to give you quite the answer that you are hoping for. Certainly there are arrangements elsewhere in Australia, and in South Australia in particular, where the management of water extraction for mining purposes is based effectively on a net extraction mechanism. So approvals or licences are issued for the issue of an amount of water net of what is extracted and what is reinjected into the system. I think there are a number of issues that need to be considered with the management of reinjection. That is associated with understanding the circumstances of the aquifer into which the water will be reinjected, the quality of the water that is in situ, whether there are any ecological or other environmental assets that depend on those aquifers, and therefore whether the water, if it was to be reinjected, might impact on those circumstances. Again, just as depressurisation has the potential to impact on adjacent aquifers, repressurisation or pressurisation of aquifers also has the potential to have a physical impact. So a careful understanding of the circumstances of the individual projects is quite important.

What that essentially means, I think, is that there is no one size fits all solution to the issue of aquifer reinjection. Certainly, aquifer reinjection occurs in a number of ways. There are other examples elsewhere, for example, of stormwater or recycled water that has been produced and being injected into aquifers, effectively as an alternative storage to dams. That is occurring in South Australia and in Western Australia as well. So the process of injecting water into aquifers is not particularly new. However, the choice to inject water, particularly if it is the residual brine from water treatment activities, involves a number of technical aspects that would need careful analysis. Certainly I am aware of comments from both the industry and elsewhere that that will not always be an appropriate solution either from an environmental or from an economic perspective.

The Hon. GREG DONNELLY: Three dot points further on—and Mr Buckingham has touched on this—you talk about "clear accountabilities". I gather, from it being stated in the terms of "clear accountabilities", that the premise is that in fact at this point in time there is a view that there are not clear accountabilities in place, or that there may be emerging clear accountabilities but that they are not as clear as they should be from the commission's point of view. Is it the case that, looking at the nascent industry now in New South Wales and a more mature industry in Queensland, the question of accountabilities is not as you think it ought to be? Is that a fair statement?

Mr CAMERON: I think it is a fair statement that we are seeing those arrangements evolve over time. Certainly, when this position statement was issued, in December 2010, the commission had concerns that there were not clear accountabilities, or, more importantly, that there was not transparency about what regulatory and accountability arrangements were being put in place. We have seen a number of regulatory steps, both in Queensland and in New South Wales, which either have improved or have the potential to improve the clarity of accountabilities and the transparency of those mechanisms. But in both States I think it is fair to say that the regulatory arrangements are still under development, and until we see the final development of those arrangements it would I think be premature to make a judgement about whether those mechanisms are strong enough to deal with the issues that we are facing.

The Hon. GREG DONNELLY: In relation to this same question—and you might take this question on notice if you want to reflect on it—in terms of the key organisations or bodies associated with the accountabilities, you obviously have the mining companies and you have State governments I presume. I will go through some others and see if there are others that you have in mind. There is the Commonwealth Government. In our inquiry the role and interest of local government has been very strong, and that has been presented forcefully—and so on. In terms of identifying those that should be brought into the accountability net, does the commission have a defined list of who should be at least considered as part of what would need to be a comprehensive package of accountability?

Mr CAMERON: The first comment I would make is that the commission's comments come very much from the perspective of the water related issues here. There are a number of coal seam gas development issues that I am sure the Committee has heard much about, but the commission does not take a view on those issues. So, from a water perspective, the commission acknowledges that the States are the primary level of government responsible for water management, as they are for the development of the extractive industries. The industry itself, as the proponent, clearly should have accountabilities and responsibilities for managing the impacts of their operations as well.

What we have called for is clarity about what the management arrangements should be; what the appropriate thresholds of decision points of acceptable and unacceptable impacts actually are; clear identification of those organisations within government, primarily at the State government level I would expect,

for the monitoring of those impacts and for the appropriate escalation of activities, including enforcement action as appropriate where impacts go beyond what are the bases of the approvals. On the industry side, we believe, as we have indicated in our position statement, that fundamentally the costs of those sorts of impacts should be borne by the industry; that where there are impacts that require rectification, make-good or other activities, then the industry itself should bear those sorts of obligations.

The Hon. GREG DONNELLY: That takes me to my next point, which relates to the next dot point, which you just touched on. That is the bearing of costs that may be associated with damages or related matters. You say, fairly unambiguously, that the framework is one of "bonds and sureties to deal with the uncertainties and the timeframes associated with potential impacts." Is the commission aware of any examples currently operating that we could look at as perhaps a model whereby a company undertaking certain extractive mining provides bonds and sureties over such a long time frame as you set out there? From evidence the Committee has received, the impacts of water may not manifest for some time into the future, if at all. So the timeframe is important. Do you have any knowledge of industries, domestic or overseas, that might provide a framework that the Committee could look at?

Mr CAMERON: Certainly the use of bonds or sureties or other arrangements is not unusual for managing impacts, particularly in the mining sector. I would not be able to give you a particular example of a lengthy period of time beyond the understood life of the production of a particular development. But certainly there are mechanisms that impose obligations, either through bonds and sureties or other arrangements, for the management of the closure of those sorts of developments. I think it is fair to say that the management of potential and uncertain impacts over a longer period of time would require a reasonable level of innovation in regulatory systems and structures to be able to handle that sort of obligation.

The Hon. GREG DONNELLY: Given that some of the matters that I have touched on, included under your heading of principles, are not settled matters but are in fact the basis of ongoing consideration by governments as we speak, is that what takes you to your second-last dot point about the precautionary and adaptive approach? The thrust of your submission is that a number of things need to be worked through. Some of them are quite complicated and traverse territory that we have not been used to in the past, particularly your last point about long timeframes. Is that why you are advocating this cautious approach to this emerging industry? Is that at the heart of what concerns you?

Mr CAMERON: Fundamentally, that is correct. What we are looking at is potentially the quite rapid development of an industry that has the potential to have a material or significant impact on water resources, probably more so in Queensland than in New South Wales because of the nature of the systems in Queensland, where we do not have now perfect information and, like most water management issues, we are unlikely ever to have perfect information on which to base these decisions. So it is appropriate to have a careful management arrangement that identifies high-risk activities and approaches those in a precautionary way, that identifies other areas of development where the level of risk is manageable through adaptive arrangements that seek best available science at the point of approval, but regularly and continually monitor those arrangements to have clear thresholds for concern which would trigger decision points about changes to management arrangements over time. As we have seen in recent times—for example, in the announcement by the Commonwealth Government to invest a significant amount of resources in research regarding regional impacts, and more recently to look at harmonisation of regulatory arrangement—as those initiatives and the initiatives of State governments come through, then regulatory arrangements can evolve to respond to any new information.

CHAIR: The National Water Commission made a submission to the Senate inquiry or the department concerned with coal seam gas?

Mr CAMERON: That is correct.

CHAIR: Have you had any opportunity to discuss these views, for example, with the Queensland Government?

Mr CAMERON: The commission staff discussed the position statement with the Queensland Government before we issued it. We certainly have had ongoing discussions with the Department of Environment and Resource Management in Queensland since that date.

CHAIR: We are out of time. Mr Cameron, thank you for agreeing to give evidence this afternoon. It is important we get a Federal overview of what may happen in New South Wales. Water is a particularly poignant

issue at the moment for all the States, as well as the Commonwealth. We would appreciate it if you can supply answers to any questions on notice by 30 January 2012. Thank you for your detailed submission which contains many recommendations.

(The witness withdrew)

(Short adjournment)

ANDREW DAVID GREGSON, Chief Executive Officer, New South Wales Irrigators Council, and

MARK ANDREW MOORE, Senior Policy Analyst, New South Wales Irrigators Council, affirmed and examined:

CHAIR: Thank you for attending our inquiry to give us the benefit of your knowledge. Would either or both of you like to make a brief opening statement?

Mr GREGSON: If we might, both of us will make a very brief statement on marginally different subjects. The document that we submitted to you as our primary submission had the word "draft" written across it. It had not at the time of closing of submissions gone to our full council. It now has and it has not changed. It is now the policy of the New South Wales Irrigators Council.

CHAIR: I can scrub out "draft"?

Mr GREGSON: Please. I trust you have read the submission in great detail. If you have not, can I suggest that you do because we are pretty pleased with it as a submission? We think that it adequately covers what is a fairly difficult outcome that I am sure you are seeking and I know that most players in this debate are seeking, that is, balance. We are not here to oppose mining or coal seam gas exploration. We are here to assist in finding a means in which agriculture, mining and coal seam gas communities and those who are involved in these regions can comfortably coexist. I think that our written submission provides suggestions on how that might occur.

Can I also say at the outset that as a council we have supported the process on which the New South Wales Government has embarked, that is, a process that takes a policy particularly in respect of water resources and makes it regulatory pursuant to the Water Management Act? Policy processes are all well and good but unless they receive the backing of the legislative process then they are not as useful, particularly in terms of long-term planning, as those that our constituents need. I note that the Commonwealth is increasingly taking an interest in this particular area. We have some significant concerns in that respect because our understanding is that this is quite clearly a State-based issue. Approvals will continue to be issued at a State level. As a result we need to see the regulatory framework in place at a State level.

Our submission in respect of the role of the Commonwealth is that moving down a pathway towards having State regimes that are similar in nature provides a definitive benefit to mining and coal seam gas operators in knowing that certainty can be achieved across State borders. It is not in our interests. It is not an issue of ours in any way, shape or form. We just want to see water resources in New South Wales protected and we believe that the regulatory regime proposed here is one that can and should work. With that, for specific comments on the process I will hand over to Mr Moore.

Mr MOORE: We are pleased to be a part of the Strategic Regional Land Use Policy Reference Group. I would make it into an acronym but then it sounds like I have been drinking. We requested to be involved because a balance between competing users ensures that the protection of water resources must be found. There really is no option. We do not believe there is an option for failure in this particular process. The process is still ongoing and one of the most critical pieces is still missing. We have yet to see the final draft of the aquifer interference policy. This piece is, from our perspective, the piece that underwrites the entire policy. Until we evaluate and understand that critical piece of policy the outcome cannot be known and until that outcome is known we feel that the further development of mining and coal seam gas resources should cease. We believe we need to wait until we have all the information and we need to wait until we get this right. We do not really understand why there is a rush to extract all these resources. They are not going anywhere. If people cannot wait for the Strategic Regional Land Use Policy process to be concluded, then we believe that their motivations need to be questioned.

The Hon. JEREMY BUCKINGHAM: Hear! Hear!

The Hon. GREG DONNELLY: Thank you, gentlemen, for coming today to give evidence. Would you elucidate on the comment you made, Mr Gregson, in your opening statement about the view that this is primarily a State matter? Reflecting on comments of the Commonwealth Government in recent times, we are yet to see further initiatives by the Commonwealth in this area. I am not an expert in this area but I presume that some of the large aquifers run underneath State boundary lines and there may be other reasons why the

Commonwealth Government sees that it should play an active role in this area. Do you believe that the Commonwealth should, to use the common phrase, butt out and leave it to the States individually to come up with frameworks and to have comity between those frameworks as closely as possible so that companies operating across borders are not dealing with multiple pieces of legislation and regulation? Is that your primary submission?

Mr GREGSON: Partly. If I might elucidate on that, we are not trying nor do we want to buy into the Commonwealth versus States argument because it is largely political. From a practical point of view, the framework that New South Wales has embarked on is one that appeals to us as something that can deliver a reasonable outcome for all parties, particularly the regulatory strength of the aquifer interference policy. We harbour some reservations about the constitutional capacity of the Commonwealth to be involved as an overarching body except by agreement, possibly through the Council of Australian Governments process.

The last thing we want to see is a policy framework as opposed to a regulatory framework that ends up in front of the High Court. What we need, and I daresay the resource extraction industry needs, is some sort of certainty to be able to invest and continue to operate. If we wind up in the Commonwealth sphere and the High Court debating what the Constitution does or does not mean, I do not think that provides a sensible outcome for anybody. From our perspective that regulatory framework in New South Wales is likely to be about the strongest and most sensible protection we can hope for.

The Hon. GREG DONNELLY: I take the point you have just made. Do you have any fear that you could end up with a potential scenario where States are competing against each other by creating less regulation, if I could use that phrase, to make it more attractive to draw an industry compared to a State that decided to be more rigorous in the way its legislation regulated the industry? Does that create an issue for you?

Mr GREGSON: I think as a policy and advocacy group engaged in the Basin plan that we probably have some expertise in State boundary matters and particularly the Commonwealth involvement in it. Could you potentially see States competing via a regulatory framework as to where mining and coal seam gas exploitation exists? Yes, you could. If States are prepared to do that then I think they are probably selling the long term in favour of the short term. Would we be better off with a similar if not identical protocol across all States? Yes, absolutely, in the same way that we would be better off with the same rail gauge across States. But is that the be all and end all? Our argument would be no. The be all and end all for our members is to have a strong process that applies to New South Wales. At the moment we think the best way for that to occur is via the New South Wales Parliament.

The Hon. GREG DONNELLY: I take you to page 6 of your submission about produced water. What you say there is self-explanatory. Would you like to make any further elucidation on that point? This issue has come up at a number of hearings that produced water is a feature of the industry, perhaps more so in areas where production may take place. There seemed to be quite a few management consequences associated with it. It is a feature of the industry and we have to deal with it. Do you have any further comments?

Mr GREGSON: There are a few and perhaps from a perspective that you would not first guess. Of course we are concerned about produced water but the same time we are not in the luxurious position of a long-term average of having too much. Across parts of the Basin right now we have far too much but that is temporary in nature. The addition of some of these water resources to agriculture is not necessarily a negative result. However, as to some of the contaminants within that produced water, very small volumes can have a massive negative implication, particularly salinity. Salt is a very difficult element to pick up and remove from the Murray-Darling Basin, particularly at lower reaches of the basin. It is one of the primary reasons why we are going through the Basin planning process at the moment.

To approach it from a different perspective, one of the things that we are concerned about, and you will notice in our submission we are saying, that any reintroduced water that has been treated must be to at least the same quality. We actually do not want reintroduced water to be far too pure because that in itself potentially creates environmental problems where water that has been introduced that is too pure can have negative implications for native flora and fauna. Not to put too fine a point on it, we do not want to get blamed for everything to do with the rivers.

The Hon. GREG DONNELLY: In the second last paragraph under the heading "Produced water" you say:

The treatment of contaminated water (be it saline, extracted water or removed water from operations that contain chemicals) must include filtrations to remove heavy metals.

Is it your understanding—and if you do not know the answer say so—that heavy metals or at least traces of heavy metals are a common feature of the produced water that comes out of aquifers?

Mr GREGSON: I am not a scientist. My understanding of heavy metals is based largely in the late 1980s. I cannot help you with that one, sorry.

The Hon. JEREMY BUCKINGHAM: Your submission states rightly that there are three separate phases in mining and coal seam gas activity: exploration, operation and post-operation. What is your view on the similarity between the exploration phase and the production phase? There is often an argument put that we must explore to find out what the impacts on the hydrology will be, the geology, the landscape, the community as well. Do you think that the exploration phase should be how we are assessing the potential impacts or would it be better handled by an independent body?

Mr GREGSON: We have made a number of comments. Right through the submission it says, "independent information is absolutely critical to understanding what is going on". Independent experts paid for by applicants for mining exploration licences—I do not want to cast any aspersions on them but, frankly, a consultant will say what they are paid to say. To add, if I may, a caveat to your question, "is there a great deal of difference between the two?", it needs to be overlaid with "given current technological constraints". At the moment in order to understand what is happening particularly in an aquifer or to understand the coal seam gas production site, you actually need to drill a hole into it. That is what current technology allows you to do and there is a risk associated with that.

Our argument in most circumstances would be that that risk is too great. As my colleague alluded to earlier, what is the rush? Coal seam gas or the coal seam itself or any other mineral deposit is not going anywhere. There is no rush to get in and exploit it now; let us wait until such time as the technological constraints are broken through and we can analyse what the impacts will be without having to risk those impacts in the first instance.

The Hon. JEREMY BUCKINGHAM: I agree. As irrigators or representatives of irrigators do you know of any instances where you have stacked aquifers, say, with quite some separation in the geology whereby there has been a significant draw down of a lower aquifer, or even a higher aquifer, for that matter, where you have seen a depressurisation, a de-watering, of one of those adjacent aquifers? Is that a process you are familiar with?

Mr GREGSON: I cannot say that I can point you to a direct example other than anecdotal evidence, which is not particularly useful to you. What I can say is that yes, we are aware that there are stacked aquifers statewide and their use is very much a part of the inquiry that you are conducting at the moment. We understand that there is to be a stacked aquifer policy that is to be published by the department. We have not seen it as yet but we are looking forward to it. We have heard from some participants in the coal seam gas and mining industries that we are only interested in those aquifers that are below that for use, therefore we are only drilling through it, therefore it is not a problem, to which our response would be, "That's what BP said in the gulf".

The Hon. JEREMY BUCKINGHAM: The issue around water quality is fundamental. Clean water with less salt is much better for irrigation and you will end up with less salt and other nutrients deposited in your soil and potentially in your rivers. I note that you have made the point a couple of times that after the water has been processed from coal seam gas and the produced water has to be at least the same or of a higher quality. What is your view on the residual? There has been a suggestion that a use will be found for this water and that may be the case. The 300 gegalitres of water that is new to the system and can be irrigated, as long as it does not have high salt there is no problem. What about that super saline brine? In the case of Queensland they are saying 30 to 40 million tonnes, tens of millions of tonnes of salt. What is your view on whether we should be creating that much salt in the system, whether we can manage that salt and how we should manage it?

Mr GREGSON: I think you have hit the nail on the head with the term "manage it". I would have thought that it was incumbent upon the proponent of a particular scheme to provide a management scheme which is satisfactory to regulatory authority approval. I think we have pointed that out in the produced water section of our submission where we are talking about a closed system. That closed system must not allow for escape. How the contaminants within that closed system are then treated, my suggestion would be that they need to be removed from the capacity to be released back into the environment, particularly when we are talking

about salt in the Murray-Darling Basin. You cannot leave salt there. The first thing that happens is that it rains and all of a sudden it is back in the system. So storage and treatment of those by-products is something that we think the proponents should be responsible for providing a management plan for.

The Hon. JEREMY BUCKINGHAM: Do you think that management plan should be in place, that technology should be developed before go is pressed on this industry? Do you think that technology must be proven before there are any major development approvals?

Mr GREGSON: What we advocated in the executive summary of the paper on page 1 probably covers that quite nicely. Our whole approach has been a no regrets policy. It says if you can prove beyond a reasonable doubt—you will notice that we have put in there a criminal legal burden of proof and we did that quite purposefully to raise the burden of proof as high as we possibly could, and I suggest that in terms of contaminants that is appropriate—that your management plan can deal with this, that it will be a closed system and that those contaminants will be removed. I suggest that that allows for the development of technology. Yes, it must be in place before approvals are given and production or exploration commences. If that technology does not exist at the moment, it comes back to what we said earlier: What is the rush?

The Hon. JEREMY BUCKINGHAM: I am a bit worried; I am agreeing with you on a lot of things.

Mr GREGSON: I am sure we can fix that.

The Hon. JEREMY BUCKINGHAM: We will talk about the Murray-Darling Basin draft plan. The other technology that is often talked about is aquifer re-injection. We had a scientist, Stuart Khan, who was very sceptical of the management regimes that were being implemented in Queensland dealing with salt but also about aquifer re-injection, that there is a potential for even clean water to change between—

The Hon. SCOT MacDONALD: Point of order: I was pulled up for embellishing a witness' statement. I think the Hon. Jeremy Buckingham is treading perilously close to that.

CHAIR: I remind the Committee that if you are putting a question to the witness, by all means refer to statements that are made but get to the question, ask an opinion and we will leave it at that.

The Hon. JEREMY BUCKINGHAM: If you are injecting large volumes of even cleaner water into an aquifer, is that a risk in terms of changing the chemistry, mobilising compounds that may not have been mobile before?

Mr MOORE: I guess I go back to the point that Mr Gregson made: We are not scientists, but that is something that we have heard from our members and there are people who have concerns about how the water is being re-injected, what level of quality it has been changed to, the chemistry has changed. If you put that back into an aquifer where there is existing water there is potential that that could cause a problem.

Mr GREGSON: There are some wider ramifications than just water quality because remember there is a lot we do not know about an aquifer. You may be changing the pressure within that aquifer. You may be changing the level and that is part of the no regrets approach that we advocate. Let us wait until the technology is such. The changes from re-introducing water to that aquifer are limited but we do not deny that there are potentially benefits from re-injection.

The Hon. JEREMY BUCKINGHAM: Obviously irrigators are under a lot of pressure from the environment movement, a lot of city-based groups. Because they are paying for water now they have done a lot to cut water use throughout the Murray-Darling Basin especially. What is your view on the allocation under the draft Murray-Darling Basin plan for 300 ggalitres of water out of the Oxley-Gunnedah basin?

Mr GREGSON: I presume you are referring to the draft basin plan.

The Hon. JEREMY BUCKINGHAM: Yes.

Mr GREGSON: What is our view of that? My understanding is that the Murray-Darling Basin Authority was asked to assess a range of aquifers they did not during the course of the guide, and they have assessed what the sustainable diversion limit is from those aquifers. How or if or when that water gets used is obviously a State-based regulatory regime.

The Hon. JEREMY BUCKINGHAM: But the draft plan is suggesting 300 gigalitres of groundwater in that basin for mining. Is that something that you are aware of or concerned about?

Mr GREGSON: I am very aware of it and they certainly have not suggested that it is for mining. I think that is one of the most remarkable beat-ups that I have ever heard from the environment movement. What the MDBA was asked to do was assess what the sustainable diversion limit of that aquifer was and they did. What happens to that water, if anything, is a decision for a State Government.

The Hon. JEREMY BUCKINGHAM: You are suggesting that there was no suggestion that those 300 gigalitres were for mining.

Mr GREGSON: My understanding is that the letter—we have a copy of it, as I am sure you have from Friends of the Earth, which got it under a freedom of information request when they could have just asked for it in the first place—was that the New South Wales Commissioner was asked to assess what is the volume of water that is sustainable from this particular aquifer because it may be available for a range of industries, including mining. I just do not think there is a massive issue in this. The MDBA was asked to do what they do, assess the sustainable diversion of an aquifer.

The Hon. JEREMY BUCKINGHAM: So if there were 300 gigalitres of water coming out of that particular groundwater basin that is not a cause for concern?

Mr GREGSON: It depends on what you do with it.

The Hon. Dr PETER PHELPS: If it is the irrigators it is not a cause for concern at all.

Mr GREGSON: No, if it is sustainable, but it is not for irrigators. It is saline so our concern is in respect of what happens to the salt load contaminant that comes out of it and what it is used for and where that salt load ends up but the sustainable use of the resource is not something that we stand against.

The Hon. JEREMY BUCKINGHAM: Rabobank, which has made a submission, is obviously a major source of capital and a lender in the agricultural sector in Australia, and they are calling for a moratorium, like I think you are. One of Rabobank's concerns, and it has been put to us throughout our tours around the State, is the sterilisation of a percentage of property from coal seam gas. The coal seam gas industry says it is 2 per cent; farmers have said it is 20 per cent. What is your view of how well coal seam gas and its associated infrastructure and the maintenance and all the rest of it can integrate into a modern irrigation enterprise?

Mr GREGSON: Difficult. My basic knowledge—

The Hon. JEREMY BUCKINGHAM: When I say irrigation I mean broad acre.

Mr GREGSON: My basic understanding of coal seam gas is the development of a large array of both wells and pipelines. In some farming land—not all of it—you can put a pipeline into an area that will not cause a great deal of impact. In irrigation that land is regularly, particularly for broad acre irrigation laser level and land formed to the extent that water is used most efficiently. You will then see large amounts of infrastructure sometimes on top of that land—I am talking in terms of laterals or centre pivots. That sort of stuff cannot work if you have pipes running across the ground. You cannot run your lateral centre pivot irrigator over the top of coal seam gas pipelines unless they are buried, which has its own problems. One of the things we have advocated in the regional land use stakeholders group that Mr Moore has talked about is what strategic agricultural land is. I understand that that definition is still up for debate but we have submitted that land that has had significant expenditure poured into it to develop for infrastructure for irrigation should be considered strategic and as a result quarantined.

The Hon. SCOT MacDONALD: The main thrust of your submission is that the industry needs to have a water access licence and be part of the water sharing plan. Is that a fair assessment?

Mr GREGSON: Absolutely.

The Hon. SCOT MacDONALD: Can you give us any instances where people feel that is not the case? What I am trying to get to is that we are talking about something in the future. Have any of your members come

to you and said they are looking at their neighbours who are extracting water and are not subject to all that regulation at the moment?

Mr GREGSON: Again there is some anecdotal evidence of it but I cannot direct you to any particular instances. What we are looking at is the future regulatory framework. You will notice that we have said in here a couple of times that exemptions from holding water access licences should not be granted. This is a commercial activity. We are required to hold entitlements. I notice it was said earlier that farmers now pay for water. Irrigation farmers actually own water access licences. They are available in the market. If water is required for mining or coal seam gas operations then the market exists to purchase those entitlements.

The Hon. SCOT MacDONALD: Just getting back to this produced water, how would you see that working out in a water sharing plan where someone might actually be able to gain a credit, if you like? This is new water, it was not part of the original water sharing plan or part of the original groundwater figures. Have you put your mind to how someone might have some megalitres going back into the system and what the implication might be for the catchment or the total water sharing plan? This is fairly new stuff that we are all grappling with and I am interested in your thoughts.

Mr GREGSON: I think that the framework exists to do what you are talking about, a debit and credit system. If you are extracting it under an entitlement in the first instance and you are reinjecting it and the regulatory requirements for reinjection have been met then there is no reason that it should be metered twice. That is, if it is extracted on the first occasion and metered under an entitlement and then reinjected, next time you extract it it should not be metered again, you would have thought. So that debit and credit system might work, but it is going to obviously need to have the regulatory framework around quality of reinjection.

The Hon. SCOT MacDONALD: The New South Wales Irrigators' Council would be in a good position to contribute to that regulatory build up. In comparison to the Murray-Darling Basin Plan which Mr Buckingham spoke about, we are looking at 2,750 gigalitres potentially taken out of the basin. Do you see the coal seam gas issue as being anywhere near a greater risk to the basin than consumptive water, or even what some people are aiming for which I believe could be in the region of 4,000 gigalitres? How would you relate those two risks to the basin?

Mr GREGSON: We have stated consistently over the course of the last 12 months that mining and coal seam gas is the next basin plan. For us the issues will be at least as big as one another. One of the reasons that we say that is we recently provided a map to our membership particularly in southern New South Wales around the Murray and Murrumbidgee and Lachlan catchments who thought that this was primarily a northern issue. We pointed out that there are a whole series of exploration licences right across the State, including along the banks of the Murrumbidgee and Lachlan rivers. All of a sudden they sat up and took notice.

The Hon. SCOT MacDONALD: If the mining started to enter those markets, whether it be the Lachlan or the Murrumbidgee, and they had to buy that entitlement, is that necessarily a bad thing? At the moment the water price has dropped to next to nothing, so to speak, especially once the Commonwealth has exited the markets. Is it necessarily bad that someone can trade their water to someone who believes they can extract some value from it?

Mr GREGSON: The Irrigators' Council was founded 27 years ago on the belief that water should be treated as a real property right. To a significant extent that has been achieved over that period of time. It would be at the very least churlish of us to say that other commercial operators should not be in the water market. But the water market exists and this is exactly what it is for. If people need to acquire water for commercial purposes, the market exists.

The Hon. RICK COLLESS: You talk in your submission about the aquifer interference policy and you have mentioned the strategic regional land use policy and so on. Can you give us some idea of what you consider to be the important components of both of those policies?

Mr GREGSON: For us the aquifer interference policy is the key to it. There were changes made at the end of last year to the Water Management Act to allow the aquifer interference policy to become a regulation. That is why we supported the New South Wales State process. It has a framework in place to work and to work well not only for us but for the coal seam gas and mining industries as well. As we said at the outset, we have got to find a way for everybody to coexist, so we are very much in favour of that regulatory framework.

The aquifer interference policy has only been published in first draft form. We had some significant issues with it. We have made our submission back to the department. We are now waiting for a second draft. We were told that it would be before Christmas but we foolishly did not ask which year. In terms of the land use task force, Mr Moore has been assisting in that process and might have some comments to make on that.

Mr MOORE: There are a couple of things that are making up that policy. Right now it is the development of a gateway process that they are going through, so they are talking about the mapping process.

Mr GREGSON: The gateway process is probably the key to it though. There are some natural tensions on that task force but I think those tensions have the capacity to squeeze a decent policy arrangement out at the end of the day. I understand that the time frame for completion of that has been extended, which is not necessarily a bad thing. If they need extra time to get it right they should take it. But in the meantime it is disconcerting to see the headlong rush by some mining and CSG exploitation companies trying to get into it.

The Hon. RICK COLLESS: Can you be more specific on what actual components you would like to see in each of those?

Mr MOORE: There is a cost-benefit analysis that we are coming up with as well but again, having been involved in the strategic land use policy reference group, we have not seen the detail around it. So there has been a lot of back and forth and a lot of information that has been provided and has potentially been explained, but about four hours worth of information has been crammed into two hours. So it has been very difficult to get a lot of detail on these things. Right now the biggest piece we are working on is the gateway process to determine the stop light, red light, orange light, green light process. That will be I think the going ahead point for that but there are still a lot of gaps in the whole process that are really coming to a head for us.

Mr GREGSON: There is one key component that must be in the aquifer interference policy. At the level this Committee is operating I think it should be of interest to you. There has been perhaps a focus on assessing individual operations or individual permits. There must be a consideration of cumulative impacts. With aquifers in particular, groundwater is like a pin cushion. The first couple of holes do not make any difference but if you put a couple of thousand holes in it—it is the marginal impact of what occurred. So that cumulative impact we suspect has not been given sufficient consideration to date because, as Mr Moore says, we are waiting on quite a few details.

Mr MOORE: The other part I would make a comment on is the time frame that we are looking at. Mining is a fairly short time frame to extract but not much can compare to the value it is going to produce. Whereas the people we represent in irrigation, it is a long-term activity so we need that time frame to be much greater. We are talking about 100 years as opposed to the 10 to 20 years that mining will out-compete anybody else really. So that is a pretty important part to go along with the cumulative impacts.

The Hon. RICK COLLESS: Your membership is comprised of irrigators of different ilk, such as flood, lateral move, centre pivot and spray?

Mr GREGSON: We represent water access licence holders. For whatever purpose they hold those water access licences, that is who we consider our constituents to be.

The Hon. RICK COLLESS: Going back to that issue of the 300 gigalitres of produced water that is potentially going to be available. If the companies put that through a reverse osmosis process and clean it up, surely the product of that process might be something like 250 gigalitres, for example. It is going to be highly valuable water in terms of the irrigation industry, is it not?

Mr GREGSON: It is certainly going to have a value. What that value is depends on the season and where it happens to be. For example, a megalitre of water in the southern basin three years ago traded about \$1,200 and now it is \$20. The value will be set by the market.

The Hon. RICK COLLESS: The good thing about it is when it is worth \$1,200 a megalitre it will still be there, whereas a lot of other water will not be there.

Mr GREGSON: Absolutely.

The Hon. RICK COLLESS: On the irrigation infrastructure you commented that you did not see that a coal seam gas system could be overlaid on that. If the irrigation infrastructure is there before the coal seam gas people come in, do you not think it would be feasible and possible to design a coal seam infrastructure around the irrigation infrastructure?

Mr GREGSON: I would certainly hope so, and a regulatory regime that required that may well get over that problem.

The Hon. RICK COLLESS: I cannot see how it could work otherwise, I have to say. That is not only for the irrigation industry but also for those farms that operate on sloping land where they have got soil conservation infrastructure and those sorts of things in place. Anything that is going to overlie the property infrastructure must work in conjunction with it, not against it.

Mr GREGSON: I would certainly hope so.

The Hon. Dr PETER PHELPS: I have quick dumb question. On centre pivot irrigation in a square paddock, what are those little bits in the corner used for?

Mr MOORE: There is some technology now to enable those to be used, but centre pivots are still some of the most efficient infrastructure around. But of course a lateral move does allow you to use up all of that land as well.

The Hon. Dr PETER PHELPS: While driving to Deniliquin I saw a lot of these centre pivots but with essentially scrub or bush or trees just doing nothing. I thought it would be a good place to put a coal seam gas well.

Mr GREGSON: They are not necessarily doing nothing. They may well be there as a native vegetation barrier. At the same time I suppose from our perspective you have got to understand in the basin that land is not the constraining factor, water is.

The Hon. JEREMY BUCKINGHAM: You said something interesting which has not really been dealt with. That is, what happens after coal seam gas has gone? What is your view of make good? You would be experts in bores of all sizes. What is your view of the industry's assertion that it can drill a double steel cased borehole down 650 metres, extract gas for 15 years and then cap it, seal it off at the top and that it will be good forever? What is your view of the long-term liability of this industry in the context of what Mr Moore was saying about the long-term value of irrigation of agricultural versus the high return but ephemeral nature of mining?

Mr GREGSON: Can you cap it and it will be all right forever? If a proponent of a project can present independently verified evidence that shows on a burden of proof beyond reasonable doubt that that can occur then the regulatory regime should allow that through. But on the basis of our submission, we are looking at a risk management matrix. We are looking at the capacity for damage that can occur and seeking a bond process that recognises the potential implications that may occur and has those bonds set aside for remedial works if required.

Rather than us sit here and tell you that this industry should not be allowed to progress because there are potential problems—let us be honest, that is not going to happen. We need to find a way for these two industries to sit by side in and the short, medium and long term. Our suggestion of that risk management approach and the beyond reasonable doubt framework for the provision of independent proof I think is probably the best we can achieve to get that process happening.

The Hon. JEREMY BUCKINGHAM: I accept that. The whole idea of a bond or a security is good. Mr Gregson, you said we have to live together for a long time. A lot of this gas will be exploited in 10 to 30 years. What about the liability for hundreds if not thousands of bore holes across a basin that have to be managed? Firstly, do you think they will have to be managed and, if so, who should be responsible? Companies could come and go and the bonds could come and go. Who has the liability for managing 1,000 bore holes in the Namoi Basin in 50 years? There is the make-good issue that Senator Bill Heffernan raised. What is your view on that?

Mr GREGSON: We would rarely disagree with Senator Heffernan because it would take us hours to get over listening to it.

The Hon. Dr PETER PHELPS: I think Senator Heffernan's suggestion that most New South Wales irrigation transfer to the Northern Territory probably cruelled the pitch a little.

CHAIR: Order! We are running over time. The witnesses should be given the opportunity to answer.

Mr GREGSON: You are correct: we have a long-term problem and we need a long-term solution. We do not advocate that a bond should be given back two or three years after the conclusion. If the extent of the potential impacts is 20, 30 or 50 years away, that is where the bond risk matrix process has to continue to at the very least.

CHAIR: Thank you both. We appreciate your coming all this way to give your evidence. We would appreciate answers to any questions on notice by 30 January.

(The witnesses withdrew)

ELAINE MARGARET PRIOR, Director and Senior Analyst, Citi Investment Research and Analysis, affirmed and examined:

CHAIR: You have tabled a document for the benefit of the Committee but I understand there are certain conditions on the use of that document. Would you like to state those when you make your opening statement?

Ms PRIOR: Sure. I am a director and senior analyst at Citi Investment Research and Analysis in Sydney. This is a division of the United States bank Citigroup. I have been invited to give evidence to the Committee about work I have done on greenhouse gas emissions and the coal seam gas industry. By way of background, I am part of the Australian equities research team at Citigroup and our team's role is to prepare research on Australian share market listed companies for our clients who are primarily institutional fund managers and superannuation funds.

Most of my colleagues in the team publish research into companies in specific areas and sectors, for example, banks, mining companies or retailers, but my role is to cover issues that come under the broad sustainability banner. In our jargon we call this ESG research, or research covering environmental, social and governance issues that may affect the value of companies listed on the share market. I have conducted some research into the coal seam gas industry and published reports for our clients. Our clients want objective research. If we underestimate risks, investors may find that companies they invest in may not live up to their promise as investments. If we overestimate risks, investors may avoid potentially good investments. Our role, therefore, is to provide our clients with the best, most objective advice that we can.

One topic that I have done work into, and which is the reason I was invited to appear today, is life cycle greenhouse gas emissions of the coal seam gas industry. This was to help my clients understand whether there is a risk, as is sometimes suggested, that coal seam gas is not a lower emissions alternative to coal for power generation. This is relevant to investors because it could influence demand for gas as a transition fuel towards a carbon-constrained future. I also chose to conduct this research because I did not know the answer and as a scientist I was keen to discover what the answer was and then share it with my clients.

On 17 August I published a Citigroup report entitled "Coal Seam Gas & Greenhouse Emissions: Comparing Life Cycle Emissions for CSG/LNG vs Coal". This research focused largely on the Queensland projects. I should emphasise I have not done work specifically on the New South Wales projects. As with all Citigroup's research it is circulated to our clients around the world. I gather that a copy was sent to one of the members of the Committee and I was asked if I would like to appear and talk about the work. Just to put it into context, Citi did not actively make a submission to the inquiry and my comments today will be limited to the topic of greenhouse gas and the coal seam gas industry.

I would like to briefly outline my research and findings, and the numbers are given in this report. I analysed data from the various Queensland projects and derived my best interpretation of greenhouse gas emissions. I also looked at comparative data for coal. I concluded that CSG to LNG generally compared favourably with coal, assuming that actual operating performance meets company and industry projections, but not in all scenarios. I also noted that in the longer term LNG might be compared with renewable rather than coal. I do not think that is really rocket science. Two key observations stood out: Firstly, the largest determinant of life cycle greenhouse gas emissions is the efficiency of the consuming power station. I note that efficiency improvements are actively being sought both for coal and gas technologies. Secondly, greenhouse gas emissions for coal seam gas will be heavily determined by operating practices.

A piece of research that features heavily in the public debate in Australia is work done at Cornell University in the United States. That research suggests that gas produced from shale in the United States does not have lower life cycle emissions than coal. Some commentators have thereafter extrapolated those findings to the Australian coal seam gas industry. I have looked at that work in some detail because it does have quite a high profile. Errors in that paper are well documented. However, that aside, a key argument in the Cornell paper is that a high level of fugitive methane emissions from gas production creates a high greenhouse gas footprint. It is clear to us after our investigations, coupled with a bit of common sense, that such a high level of gas leaks is unlikely in the Australian industry particularly if it could threaten the industry's future.

In our August research our base case assumed fugitive emissions of roughly 0.1 per cent of produced gas based on industry projections. We then investigated whether the conclusions would change materially if

instead we assumed that 1.1 per cent of gas escapes as fugitives, a quantity that we think is unlikely to occur. This added about 6 per cent to 7 per cent to the total life cycle emissions of CSG/LNG and did not change our conclusion that gas is generally better than coal. We have continued to follow this topic and improve our understanding. In our view the key determinant of fugitive emissions is operating practices; things like whether wells are hooked up to separators and flow lines before dewatering, flowback of fracking fluids, and whether gas that cannot usefully be used is flared to become CO₂ or whether it is vented as methane. In other words, whether best practice is used.

Our investigations led us to several key conclusions. Firstly, we are convinced that there are engineering solutions to the issue of fugitives, which leads us to our second observation, which is: Why would companies risk the industry's future rather than implement engineering solutions? Thirdly, some major operators in Australia do appear to be capturing flowback fluids and flaring rather than venting, therefore minimising emissions. Fourthly, even if best practice was not adopted for every well in the early days of the industry, new wells can be operated differently. Finally, companies have two financial incentives to reduce fugitive emissions: Firstly, the gas is valuable and the product can be more sensibly sold than wasted and, secondly, a carbon cost will apply to fugitive emissions.

To conclude, based on the work we have done we are advising our fund manager and superannuation fund clients that CSG to LNG is generally better than coal from a greenhouse gas perspective when we are looking at gas produced in Australia and consumed in Asia versus coal also produced in Australia for Asian consumption. For domestic consumption, the case even more strongly favours gas compared with coal because LNG production, shipping and regasification steps are not involved. Perhaps most fundamentally, we are advising our clients that we believe that best practice engineering solutions are available to minimise greenhouse gas emissions in the CSG industry and we expect these to be implemented rather than to risk the industry's future.

CHAIR: We understand that the document provided is for the benefit of the Committee's deliberations but you would prefer it was not publicised other than through the *Hansard*.

Ms PRIOR: Yes. Citigroup globally does not allow our research to be posted to other websites, for example, but journalists and other parties do see it.

CHAIR: That is the way we will handle it. For background purposes, what is your discipline? Is it technical, economics or what?

Ms PRIOR: My qualification originally is a chemistry degree but I have forgotten most of that, then a masters in petroleum engineering and more recently an honours degree in Antarctic studies, and also a diploma from the Securities Institute of Australia.

The Hon. SCOT MacDONALD: I think I was the member of the Committee you were referring to. You looked at this from the perspective of advising clients. Did you give any thought to the perspective of the New South Wales economy generally as an energy component for our industry? Do those things cross your desk at all?

Ms PRIOR: Our team of analysts cover different aspects of the market and we have analysts that cover the coal seam gas listed companies and do research reports on those, so that will include things like scenarios for gas pricing and demand and so on, but that was not specifically what I looked at in this exercise.

The Hon. SCOT MacDONALD: I realise you did this in August. Do you have any view about the sovereign risk aspect, if there is any, arising from the call for moratoriums? We have calls at State and Federal level and different people asking for a moratorium on the industry. If you are assessing a company that is thinking about investing in New South Wales and they come across this call for a moratorium surely that would impact on your advice and influence your advice?

Ms PRIOR: Generally sovereign risk is something that gets mentioned and is looked at by analysts globally, for example looking at the mining industry and where sovereign risk issues are bigger. It is certainly something that people have on their agenda. It is not something I have done specific work on myself.

The Hon. SCOT MacDONALD: Referring to fugitive emissions, you said you think the figure is less than 1.1 per cent.

Ms PRIOR: That is my belief, yes.

The Hon. SCOT MacDONALD: Is that evidence backed up by Queensland experience, do you think?

Ms PRIOR: What I have done is to look at estimates for the various projects but I have also spent a bit of time understanding what "best practice" might mean and how best practice can be implemented. So things like capturing methane rather than letting it escape to the atmosphere and then also specifically flaring rather than venting, if gas is surplus to finding a good use.

The Hon. SCOT MacDONALD: In your report you draw comparisons between the worst brown coal, compared to the best coal seam gas or gas operation. Can you just elucidate a bit on that? Where are we most reliably making a comparison with gas compared to good or bad brown coal or black coal? Where are we at in Australia today?

Ms PRIOR: The thrust of the work that I did was looking at the Queensland projects and looking primarily at the export example, so it was looking at producing gas in Australia and liquefying it and then sending it to Asia and comparing that with the footprint of coal produced in Australia and burnt in an Asian power station.

The Hon. SCOT MacDONALD: It depends on the condition of that Asian power station, does it not?

Ms PRIOR: There is a range of numbers here which is largely based on work done by WorleyParsons and what I am doing is trying to grasp the range of possible outcomes.

The Hon. SCOT MacDONALD: Can you drill down to New South Wales, if you start making that comparison—the condition of our power stations that we have now and for the next ten years or so?

Ms PRIOR: In New South Wales we have black coal power stations.

The Hon. SCOT MacDONALD: With emerging gas.

Ms PRIOR: I cannot claim to be an expert on what their emissions profiles would be. It is certainly lower than Victorian brown coal power stations. One thing that is different, if we are looking at the domestic situation from the numbers I did in this report, is that gas would look relatively more attractive because a number of the emissions that I included in this study are of the energy required to liquefy the gas in order to ship it and then to regasify it in the customer country. So you would find more of a differential domestically but that was not the focus of this piece of research.

The Hon. RICK COLLESS: Ms Prior, you mentioned that you had previously worked in the petroleum industry.

Ms PRIOR: I did.

The Hon. RICK COLLESS: Can you tell us in what role you were working in that industry?

Ms PRIOR: As a production technologist and petroleum reservoir engineer in the North Sea from the mid seventies to the mid eighties.

The Hon. RICK COLLESS: Was that oil based or gas?

Ms PRIOR: Oil and gas.

The Hon. RICK COLLESS: I am interested in some of the comments you make about the fugitive emissions and where they are going and I think I read in here a minute ago—I only got the submission today so I apologise for not being more familiar with it—but the fugitive emissions that have come out of coal mines are included in their greenhouse gas assessments, are they not?

Ms PRIOR: Yes, often using Government factors but some mines do measure fugitive emissions, some of the underground mines.

The Hon. RICK COLLESS: And I think you mentioned that some of those figures are in the range of .01 to .05 t/MWh. Compared to the coal seam gas fugitive emissions, how does that relate per kilojoule of energy?

Ms PRIOR: I do not know, I have not back-calculated in that particular context but I guess we are looking at different things. When coal is dug up some gas that is attached to the coal particles will escape or in an underground mine, some gas will come out through the ventilation shafts. The fugitive emissions that we are talking about in the coal seam gas industry would be, hypothetically, things like if companies were to start production from the wells without actually having pipelines hooked up, then gas might escape, which is why best practice would be to have flow lines hooked up early and then things like, depending on with gas that may be captured in a high point in a pipe line, whether that is flared or vented. Things like that—a rather different situation from the fugitive emissions in coal mining, even though it is the same gas.

The Hon. Dr PETER PHELPS: Ms Prior, are you aware of any power stations in Australia which operate at supercritical or ultra supercritical efficiency at any time, any coal fired power stations?

Ms PRIOR: I should explain what this work is. What we have done is to combine the sources of information that we could get hold of to look at the export situation and I am not an expert in terms of the exact technologies that are involved in all the different power stations in Australia.

The Hon. SCOT MacDONALD: Ms Prior, you have obviously got extensive overseas experience and extensive industry experience. What would be your thoughts about New South Wales not developing this industry?

Ms PRIOR: I think one is weighing up things like energy security and a fuel that can play a role in a transition towards a carbon-constrained world.

CHAIR: You have made it clear that the study was based on coal seam gas to liquefied natural gas as an export product versus coal as an export product.

Ms PRIOR: Yes.

CHAIR: So there probably would need to be quite a bit of adjustment done to that report or in fact a different report done where you would consider as coal seam gas, as methane, either for the power generation industry or the domestic market, versus coal for the domestic market, that is the power generation industry. They are not directly comparable, are they?

Ms PRIOR: They are not directly comparable mainly because if one is using gas domestically, one transports it in a pipeline, rather than liquefying it, which would tend to reduce one of the chunks of emissions for the export gas situation that we would not see in the domestic situation.

CHAIR: The CO₂ footprint of the transportation overseas would be roughly similar because they are both transported in ships. If the life cycle cost takes into account the transportation of the exported product to its point of use, that will be one aspect that would be roughly similar but the transportation costs from point of extraction to export and the processing therein are completely different.

Ms PRIOR: Yes.

CHAIR: Washing coal, transporting coal in trains and loading coal on to a ship, versus cleaning the gas, pumping the gas to a liquefaction plant and actually doing the liquefaction.

Ms PRIOR: Yes.

CHAIR: The point I am trying to get at is, this excellent piece of work probably would be difficult for us to make a direct comparison with a domestic situation, is that right?

Ms PRIOR: That is largely true but what we did do on page 6 was, we actually cut the data in a different direction, if you like, so what we did in figure four on page 6 was to say, what are the components of the emissions? So the production side is at the bottom of the graph, the big black bar is the consumption side

and the grey at the top is the things involved with an export industry. So in a sense if you are looking at the domestic industry, you would look at that graph but you would cut off the bars at the top of the black and ignore the bits in grey.

CHAIR: And the pieces that show the power generation side are by far the largest component in that comparison anyway, are they not?

Ms PRIOR: Yes.

CHAIR: So perhaps there is opportunity to draw some parallels.

Ms PRIOR: One could draw some rough parallels but without precision, yes.

The Hon. JEREMY BUCKINGHAM: Ms Prior, why was comparison not done with renewables? Your own paper suggests that that probably should have been an element of the research. It says at the bottom of page 3:

Minimising the emissions footprint of a CSG/LNG project would appear appropriate to reduce potential carbon costs, maintain the profile of gas as a low emissions transition fuel, and sustain support for the industry. Higher-than-anticipated carbon costs, lower demand, and/or lower industry support might pose investment risks. Since CSG/LNG projects are long term in nature, such risks could eventuate over the project lives.

On page 15 we discuss whether renewables, rather than coal, might become the more appropriate comparison in the longer term.

How long is the longer term, with the costs of renewables declining, the cost of polluting the atmosphere, the carbon price, it will end up being a floating price. It could go up—

The Hon. Dr PETER PHELPS: Will it? Is that coming out of Durban, is it?

The Hon. JEREMY BUCKINGHAM: It is a market mechanism.

CHAIR: Order! You are asking a question, so please proceed.

The Hon. JEREMY BUCKINGHAM: Further on it says:

Gas is compared with coal under the assumption that gas will displace potential coal use in power generation during transition to a carbon constrained world. However, gas still has significant GHG emissions, and it appears unlikely that the 2 degree global warming scenario will be achieved unless electricity generation is largely decarbonised.

Why have you not done an analysis comparing renewables under a different pricing scenario?

Ms PRIOR: At this stage we chose to do the work to look at the question of gas as a transition fuel and therefore looked at its comparison with coal. In terms of what happens longer term, I think that depends on one's view about where the world will actually go with climate change policy and I think that at this stage, whilst a lot of people would believe that maybe stronger action should be taken, I think that generally investors are trying to balance the risks in terms of, would there be a risk if they actually divested fossil fuels too early and the world did not get its act together on tackling climate change.

The Hon. JEREMY BUCKINGHAM: You have not done an analysis of the cost of these. This is an analysis of greenhouse gas emissions.

Ms PRIOR: Yes, that is right.

The Hon. JEREMY BUCKINGHAM: So there is no analysis here of the cost of these technologies, it is just an analysis of the greenhouse gas emissions. So why not do an analysis of the greenhouse gas emissions of renewables?

Ms PRIOR: There are all sorts of things I could do and it is a matter of time and allocating resources to doing things that I think are most useful to our clients. This was the topic I specifically chose here.

The Hon. JEREMY BUCKINGHAM: The other issue you raise is the 0.1 per cent as proposed by the Australian Petroleum Production and Exploration Association as their estimate of fugitive methane emissions

from the industry. On what research are you basing that assumption? Is it purely on APPEA's research or the WorleyParsons report?

Ms PRIOR: It is primarily on the WorleyParsons report but the reason then that I did that sensitivity case was to say, how much difference would it make to the conclusion if we assumed something dramatically different?

The Hon. Dr PETER PHELPS: Ten times higher and it is still better.

The Hon. JEREMY BUCKINGHAM: That is an interesting thing to say, that it is "dramatically different". That is quite an emotive term to use in a report which should give an objective analysis. You have said that best practice would probably mean 0.1 per cent and it was unlikely that the estimations in Howarth, that it could be 3.6 to 6.3 per cent, are correct. But on what evidence of best practice are you basing that? Where have you seen this best practice to assume that 1.1 per cent is the upper end of that sensitivity and the 3.6 per cent is inconceivable?

Ms PRIOR: Firstly, in terms of the 3.6 per cent and some of the numbers that went into the US work, there were various assumptions about how long wells were flowed back for on completion and some numbers that do not make sense, in terms of how much gas can flow out of a porous rock in a particular amount of time. For example, there is a physical constraint as to how much gas can flow in 24 hours out of a porous and permeable medium.

The Hon. JEREMY BUCKINGHAM: Did you do that analysis?

Ms PRIOR: I looked at what Howarth said, and I have looked at a load of stuff about how the numbers were derived, and that sort of thing. But also some of that work seems to be based on operating practices that, it is my understanding, are different from the operating practices here. So I think that really is the key to it.

The Hon. JEREMY BUCKINGHAM: Where is the evidence of those best practices operating? You referred to estimates of projects. A lot of these projects are in their infancy. What project did you look at that enabled you to come up with that sensitivity analysis? Was it a project in Queensland?

Ms PRIOR: One of the things we did was look at one of the projects in Queensland, and spent a fair amount of time talking to one of the project operators about: Exactly how do you complete your wells? What do you do when you are dewatering? What do you do if you are flowing back fracking fluids? At what point do you hook up your flow lines? What do you do if gas is trapped in high points in pipelines, and then you would flare it? What sorts of pumps are being used in the plants? We asked about those sorts of things. So I spent an hour talking to the head of upstream operations at one of these projects, asking questions on exactly how the company was operating the plant, with a view to understanding some of the engineering that determines how these things happen.

The Hon. JEREMY BUCKINGHAM: So, after an hour of chatting with the industry, you have determined that that is the sensitivity that could determine billions of dollars worth of investment? Even with that sensitivity, even with that 1.1 per cent—which Dr Phelps has said is 10 times more—in the worst case scenario for lifecycle emissions of coal seam gas and LNG to a closed cycle gas turbine, it is worse than supercritical, ultracritical or ultra-supercritical, or ultra-ultra supercritical, or whatever it is, coal? I put it to you that if your sensitivity is out, and Howarth is half right and it is 1.8 per cent, and we do not have these best practices that were put to you in an hour over a cup of tea, then coal seam gas could in actual fact be far worse in terms of greenhouse gas emissions than the latest coal technology?

The Hon. Dr PETER PHELPS: No, that is wrong. Have a look at page 9.

CHAIR: Order! The witness has been asked a question. I am sure Ms Prior is quite capable of answering these technical questions.

Ms PRIOR: What we have clearly said and what we have clearly shown and illustrated is that the scenarios that we have looked at show that in most cases, but not all cases, the gas scenario is better than the coal scenario. Another thing that I think is worth bearing in mind is probably that power station efficiencies would improve both for coal and for gas, so—

The Hon. JEREMY BUCKINGHAM: And for renewables.

Ms PRIOR: And they may improve for renewables. But the numbers are much smaller to start with, so I think that is a slightly different argument. But I think that we will see power station efficiencies improving, so I think it is illogical to compare inefficient gas with the most efficient coal. I think it is probably logical to compare efficient gas with efficient coal and expect both of them to improve over time.

The Hon. JEREMY BUCKINGHAM: But, still, the sensitivity determining whether or not you are going to invest in coal or invest in gas is the fugitive emissions, when as a society and as policy-makers we who actually accept science are saying that we should be decarbonising our economy, we should be moving away from both.

The Hon. Dr PETER PHELPS: Is there a question there?

Ms PRIOR: Well, that is why we talk about gas as a transition fuel, isn't it? And that is what we were looking at here.

The Hon. JEREMY BUCKINGHAM: But transition to what, and when?

The Hon. Dr PETER PHELPS: Caves.

CHAIR: Order!

Ms PRIOR: To a lower carbon world at the time if and when world policy moves in that direction.

The Hon. GREG DONNELLY: Ms Prior, could I take you first of all to page 11 of the document, which references itself back to page 7. I will come back to that in a moment. Halfway down that page you talk about power station assumptions. I think I heard you correctly when you answered a question and said that in terms of gas powered power stations in Australia you do not have any specific knowledge about the efficiency of those that are operating at the moment.

Ms PRIOR: We have not specifically looked at that. I do not expect it would be hard to get that information, but it is not something that we looked at here.

The Hon. GREG DONNELLY: That is fine. In the last paragraph on page 11—which self-references back to page 7—it says "the US Department of Energy is targeting efficiencies greater than 60% for coal-based systems and 75% for gas-based systems." Do you have any understanding of over what timeframe that is being considered?

Ms PRIOR: I am not sure what the timeframe is, but I suspect it will be incremental. What we are trying to illustrate to our clients is that we think that they ought to be thinking in terms of efficiency improvements for both. And the other reason is that I used those numbers to say: If we got to that point what difference would it make to the conclusions as well?

The Hon. GREG DONNELLY: With a statement like that from a body as significant as the United States Department of Energy, does your organisation take that as a target or targets that are realistic and achievable? I am trying to test those numbers. Obviously, you represent a very large organisation with very significant clients. The United States Department of Energy obviously is a very significant department. Do you take those figures as being realistic? Putting aside for the moment the timeframe, do you think those targets being claimed by that body are realistic?

Ms PRIOR: I discussed this with some of our energy people, and felt at least it was showing some sort of direction. Whether those specific numbers turn out to be the right ones, we do not know at this point.

The Hon. GREG DONNELLY: We will have to wait and see. What is exercising my mind is how we get to those numbers as compared to where we are today, in 2011. Obviously a fair number of incremental improvements have to take place.

Ms PRIOR: I am just trying to indicate that there seems to be some sort of improvement targets happening. But we do not know exactly what will be achieved at what point.

The Hon. GREG DONNELLY: My next question goes to this notion of best practice and to a statement you made in your opening comments about envisaging essentially engineering solutions to some of these issues. This is obviously based on the assumptions in your paper. With respect to the notions of best practice and engineering solutions, is it envisaged that those will be achieved largely in a free market framework where competing companies seek to get to those points for essentially commercial purposes, or is there an assumption that there will be a regulatory regime that will influence the behaviour of corporations to utilise best practice and utilise the engineering solutions to deal with the issues? I am unclear about the assumptions, about whether it will be imposed regulatorily, or whether or not they would be moving in that direction themselves.

Ms PRIOR: I suspect that it is a whole combination of those things, because in essence it will be the way that a whole variety of different things are done. The drivers will be a combination of things, partly the fact that any gas that escapes is not available for sale, so in the sense that the higher the gas price, the more it is worth perhaps spending that extra little bit of money to make sure that it does not escape. Secondly, the carbon price which will apply in Australia—again assuming that if the world does tackle carbon emissions more strongly—would probably be higher than it would otherwise, and therefore there would be more incentive to make sure that methane does not escape. Then there would probably be some regulatory constraints as well. And also the fact that infrastructure would be relatively new, and so some of the numbers, based on assumptions or data that is derived from old Russian infrastructure or whatever, probably is not very applicable.

The Hon. GREG DONNELLY: You might be able to answer this question. If you cannot, just say so. Looking at the best case scenario in terms of the engineering solutions and best practices, does your organisation have a view that these are being adopted and applied in any part of the world now, such that it is worth this Committee having a look at? Do you have that sort of breadth of knowledge, or is that beyond the scope of your document?

Ms PRIOR: That is beyond the scope of what I looked at here.

The Hon. Dr PETER PHELPS: I want to go back to the issue of fugitive emissions. I refer to page 13. I understand from your assessment that for an extra 1 per cent of world gas that is leaked as fugitive, assuming a 53 per cent efficient power station, for each 1 per cent of world gas leaked as fugitive you would have between 0.03 and 0.04, is that correct?

Ms PRIOR: Yes.

The Hon. Dr PETER PHELPS: That means that, even if that was right and there was a 3 per cent leakage rate, for an APPEA/CCGT of 53 per cent, that would raise it to about 0.674?

Ms PRIOR: Yes. I guess that what you are saying is that—

The Hon. Dr PETER PHELPS: And, even at the 3 per cent level, that is still substantially less than a coal-fired ultra supercritical power station's greenhouse gas lifecycle emissions, is that not correct? I refer to the final column on page 9, figure 5.

Ms PRIOR: Yes.

The Hon. Dr PETER PHELPS: And even it was at 5 per cent fugitive emissions, or 50 times the industry standard of fugitive emissions, is it not true that it is still less than the ultra supercritical coal-fired power station? The answer is yes, because I did the numbers.

Ms PRIOR: The answer would appear to be less, from looking at that, off the top of my head.

The Hon. Dr PETER PHELPS: So, even at 50 times the fugitive emissions estimated by the industry, you will actually have less lifecycle greenhouse gas emissions than you would with an ultra supercritical efficient coal-fired power station.

Ms PRIOR: I think essentially that is the conclusion. The conclusion and the sensitivity that I did really was that making a significant change to fugitives did not dramatically change the answer. Yes, we did it on 1 per cent, but one could extrapolate.

CHAIR: Thank you, Ms Prior. We really do appreciate your making this proprietary information available to the Committee for our deliberations. Be assured that we will use it as best we can. We understand the conditions which you placed upon the tabling of the material. Those will be honoured.

(The witness withdrew)

NEIL FRANCIS DOBBIN, Group Executive, Rural Banking, Rabobank Australia Group, sworn and examined:

CHAIR: Mr Dobbin, in what capacity do you appear before the Committee?

Mr DOBBIN: I am Group Executive with Rabobank Australia Group.

CHAIR: Prior to proceeding to questions from the Committee, would you like to make an opening statement?

Mr DOBBIN: Good afternoon and thank you for providing Rabobank with the opportunity to appear before the Committee as part of the inquiry into coal seam gas activities in New South Wales. My name is Neil Dobbin, I am a Group Executive with Rabobank and I have had 40 years' banking and valuation experience predominantly in the agricultural sector. I am also a director of Rabo AgriFinance, which is a principal agricultural banking arm in the United States. Rabobank is the world's leading bank to the food and agribusiness sector and is a prominent source of knowledge and analysis within the industry. We provide banking and financial services to farmers and agribusinesses throughout the supply chain. We have exposure to agricultural land and in particular for this inquiry across New South Wales we hold around 24 per cent of the market. Over the past two decades Rabobank has worked with Australia's food and agribusiness sector to improve the sustainability of agricultural production and rural communities.

I would like to share with the Committee some of the recommendations that Rabobank makes in respect to coal seam gas mining activities in New South Wales. We make these recommendations from the point of view as a leader in the agricultural industry but, more importantly, as a member of Australia's rural community. Our first issue, we are concerned that under current assessment processes the relative value of mining versus food production and water resources takes a restricted view, favouring the high upfront financial values of mining rather than the long-term economic, environmental and social values that come from the agricultural industry. In a time of growing food demand this short-term view discounts the longevity of agriculture and rural communities and, in our view, will result in intergenerational equity issues.

Our recommendation on this issue is that in assessing applications for mining activity licences that food and fibre production areas and water resources should be viewed as the most valuable resources of the future. Maintaining the integrity of aquifers and agricultural land, strategic agricultural land in particular, is vital to ensuring that the productivity of New South Wales's primary industries remains internationally competitive and well placed to capitalise on future food and fibre demands globally. As to the basis of our recommendation, one of the rare attributes that sets Australian agriculture apart from the rest of the world is our clean green image. It is a highly prized branding attribute that draws a premium to our agricultural food and fibre products. This is vital to the Australian agricultural industry.

However, coal seam gas mining activities may impact on the quality of water and soils which could threaten our clean green image. Since our submission was made to this inquiry it has been pleasing to see that a number of safeguards and recommendations have been adopted. These safeguards include bioregional scientific assessments as overseen by an independent expert scientific committee. In our view it is an important step in building the scientific knowledge and identifying impacts on water resources, which are the lifeblood of Australian agriculture industries and rural communities.

Our second issue is that the basis for compensating farmers needs to be changed to enable the coexistence of farming and coal seam gas mining activities in areas deemed suitable in the New South Wales Government's proposed Strategic Regional Land Use Policy and acceptable under bioregional assessments. One of the present impediments to fair compensation is the lack of transparency and communication between the coal seam gas mining companies and landholders around the true scale and intensity of exploration and extraction activities on the land. Our recommendation on this issue is that upfront compensation is provided to landholders due to the acquisition of land utilised for coal seam gas mining activities. The compensation must accommodate loss in asset value and productive capacity and provide for unintended consequences.

The intention of coal seam gas mining companies must be communicated to landholders upfront and transparently. The layout of coal seam gas infrastructure, which are wells, roads, et cetera, need to be agreed upon between the mining company and the landholder. An appeals process must be made available where agreement between parties is not reached. The basis for this recommendation is to ensure the coexistence of

these industries. Compensation must at least be made good as a minimum to compensate to a value that at least reinstates productive capacity prior to the mining encumbrance. The assets currently held by farmers are likely to be severely discounted if coal seam gas is to be extracted off the property.

Land values will fall due to a number of factors. This is a reality.

As to reduction in area, the area of reduction can range depending on the property. As was said previously, it can be as high as 20 per cent. There will be a reduction in productivity and efficiency, particularly with precision farming, with the presence of infrastructure, wells, roads, pipelines, et cetera. The imposition of a 15-to-20-year encumbrance of mining activities and the residual impact on property will affect future capital gain. The potential residual impact on property includes the risk of contamination of water and soil. The risk factor will always be there to an incoming purchaser. There are operational risks of coal seam gas mining activities on the property, water access rights to the property and loss of privacy.

There are the aesthetics of the property and a risk of future project expansion. The value of rural lands for prime agricultural land used for cropping activities can reduce substantially depending on the impact when coal seam gas arrives on the property. We also see a number of unintended consequences arising from a reduction in rural land values. These include a corresponding reduction of credit available throughout rural communities from lower land values and serviceability. Servicing existing debt may prove difficult through the loss of land and productive capacity associated with coal seam gas mining activities. An issue that is often not explored is the potential for re-rating of land areas to occur, which could reduce local council revenues.

A third and final issue is that exploration and mining companies with extraction and exploration licences in New South Wales require little capitalisation and other financial backing. This exposes contractual counterparties, which are the agricultural landholders, and licence issuers to risks around the provision of compensation. Our recommendation on this issue is that the Government must introduce economic thresholds and upgrade the current due diligence process of the Department of Trade and Investment, Regional Infrastructure and Services. We recommend that the Government be given a performance bond or bank guarantee by mining companies coupled to long-term liability insurance based on the scale of the licence to ensure that any financial compensation payments in the short and long term can and will be met.

The basis of our recommendation is that mining companies are not in a financial position to meet claims over the long term and the New South Wales Government or even the Federal Government may need to prepare for potential compensation claims and/or class action in the short and long term as providers of the licence. In closing, we recommend that the Committee take the opportunity to identify the weaknesses in existing legislation and address the legal imbalance between the mining and agricultural industry. We urge you to respect agriculture and farmers in preserving prime agricultural land and our vital water resource.

CHAIR: As you are in the agricultural banking industry you are probably aware that recent changes were made to the Mining Act that provide for other parties with an interest in a particular property to be notified of access agreements, in other words, banks and so on. Do you feel a similar provision could be made to the Petroleum (Onshore) Act to ensure that notification is made?

Mr DOBBIN: Do you mean to obtain permission to access the property?

CHAIR: Yes.

Mr DOBBIN: Yes.

CHAIR: In regard to sureties, you are probably also aware that under the Mining Act once a mining licence has been issued, which is different from an exploration licence, that a rolling fund is established or contributions to a rolling fund are made to cater for long-term failure for rehabilitation. Do you believe something similar should be instituted in the Petroleum (Onshore) Act?

Mr DOBBIN: Most definitely, yes.

CHAIR: To take that further, currently mining companies pay big money for exploration licences for coalmining but the surety under the exploration phase is very small by comparison. The point has been made here that there is a much more blurred transition between exploration and production in relation to coal seam gas

mining with the likely result of a coalmine or some other mine. Therefore, would you agree that the setting up of a surety scheme should be graduated but certainly starting right from the exploration phase?

Mr DOBBIN: Most definitely, yes.

CHAIR: You obviously act for individual landholders as that is the basis of your business. Some landholders have expressed to us that they do not support the idea of zoning on maps because if they are on that side of the zone they do not have the opportunity to enter into an agreement with the mining company and if they are on this side they do. What is your view about mapping as a solution to try to limit, if you like, the types of land upon which an activity such as coal seam gas mining can occur?

Mr DOBBIN: I think mapping is a very good idea. No matter what you do someone will always be hurt in the process. That is a part of life. I feel it is better to preserve some of the pristine agricultural lands and at least have them saved and if some people are outside the zone that is unfortunate.

CHAIR: In your opening remarks you made mention of a statement here that the amount of land that is quarantined can be from 2 to 20 per cent. I am curious to know where the 20 per cent has come from. We have heard from one landholder who had a very small landholding that an access corridor through his land, which was 40 metres wide, took out 20 to 30 per cent of the property. On large-scale or broadscale production that probably would not be the case. Do you suggest in that case 2 per cent is a more realistic figure?

Mr DOBBIN: It depends on the coal seam quantities. That is why I say anywhere from 2 to 20 per cent. The fact is that any percentage affects production.

CHAIR: And therefore devalues the asset?

Mr DOBBIN: It devalues the asset, most definitely.

The Hon. GREG DONNELLY: Thank you for coming to give evidence this afternoon. As you know, we have been travelling around the State gathering evidence. As to the value of lands, the evidence we have received is probably best stated as anecdotal to this point in relation to the impact of coal seam gas mining. Is there anywhere we can look in Australia or overseas to an analogous type of extraction industry that would give validity to the assertion that there will be a downward pressure on the values on land holdings if this industry proceeds and is allowed to develop?

Mr DOBBIN: There is probably not a lot of evidence at this stage because it is very early days. The only thing I can use is my experience. Also, you can go to valuation cases where similar easements or covenants of different items affect the land value. You can talk about easements or electricity poles, a whole heap of evidence, where an imposition like this will affect valuations. It is not all that complex. If you have 1,000 acres of land and you have lost 5 or 10 per cent of productivity, the incoming purchaser will say in relation to that property, "I can now use less land so I will pay less". The incoming purchaser will then say, "Do I really want that land with wells and pipes all over it or will I go to another block of land where it has not got the wells and pipes?"

It is quite obvious that it will impact on values from day one. It is already impacting because a lot of our clients are saying, "I am not going to buy any more country because I am not sure what is going to happen." It technically has started to impact although there is no evidence. It is just that people withdraw because they are not sure what their future is. If you are going to make a big capital investment on a property you need to know that the property you are buying will be risk free if you like. So as a value you look at the same properties that have no impediments and one with impediments. I think it would be pretty logical that the property without any impediments on it will go up much faster and much more cleaner than one with impediments on it. There will be anecdotal history there.

The Hon. GREG DONNELLY: Are you able to make any comments about the impact on valuation on properties in the State of Queensland where the industry has a longer history?

Mr DOBBIN: Some of the properties in Queensland have been basically with the grazing land and there has been less impact on that. That is why you can co-exist. It just depends on how much impact that infrastructure has on your property. In Queensland you may find that on some grazing properties they find it beneficial because the mining companies often contribute to the roads, et cetera. So we are not saying to you

that it is all bad. It is just that in the very expensive prime agricultural, particularly the farming lands and also the irrigation lands, there is no question it will have quite serious impediments, whereas in grazing land the impediment is less because the grazing is not as severely impacted.

The Hon. GREG DONNELLY: I understand your argument. I take you to page 3 of your submission where you set out a series of points. The issue, point No. 2, of this information asymmetry and how the farming communities and farmers can obtain, using your phrase, "independent information". I will not put words in your mouth, but who do you believe would be the best provider of independent information? The second part to that is—actually I will let you answer that first part. Who do you think?

Mr DOBBIN: You mean government, are you suggesting?

The Hon. GREG DONNELLY: I am asking you what was in your mind when you spoke about the independent information. Is it only governments that can provide that?

Mr DOBBIN: There could be independent consultants perhaps. The main point about this is that people need to know exactly what will happen to their property. They need to know what the impact will be. They want to know what the future is. There is not that transitional information coming into the farming communities, because the legislation does not require you to. There was a case only yesterday where a farmer at Gloucester in the Hunter Valley, the guy said, "I've got a mining company on my property. I don't even know what he's extracting. They don't talk to me and they're just on the property." This is a live example of where you just need independent advice so that farmers can make assessments on the impacts it will have. As I said, there is no or very little communication between them because they do not have to.

The Hon. GREG DONNELLY: As a counterpoint, we have had companies come before us, some of the larger players, and assert very strongly that they have endeavoured to be as thorough as they can in terms of going about their consultation process broadly in the communities that they are looking to operate in and specifically with individual farmers. Based on your experience, are you finding the contrary position? Are you finding examples where there seems to be poor communication and poor transference of details from the companies to the landowners about their intentions?

Mr DOBBIN: I think the communication in Queensland has been better. I think it is a much more mature market and there is much more communication. I think possibly, from what I have seen with our clients, it has caught them—it is so early days it has caught them by surprise and they did not understand their rights, they did not understand how to react. That causes friction and that often stops communication. But I can tell you there is a huge court case on the Cecil Plains in Toowoomba. If you have ever been to Toowoomba and seen the Cecil Plains and the beautiful irrigation country there, it is devastating to see that there is a huge fight there. There is not even discussion. I think New South Wales is in the very early stage and I think in the more mature market and the grazing lands in central Queensland there has been much better communication.

The Hon. GREG DONNELLY: I take you to point No. 4 on page 3, which is an interesting point that I had not thought about before. It has not been put quite as clearly about the potential problem of passing over some of the specific local impacts when you are looking at the broader picture of the granting of a licence. I will ask you to elucidate on that, and if you have any examples that come to mind that would help illustrate that I would appreciate it if you used them.

Mr DOBBIN: I guess all we were really trying to say is that often a licence will cover quite a broad area, quite a substantial area. The main problem is that the local farmer is just part of a huge lease. What we are saying is that in parts of that large area there could be no issues and everyone can co-exist very well, but in some areas when you get to a local scale there could be quite significant issues. That is what we were relating to. Often there may be more issues over smaller scale at the local level. That is all that was highlighting.

The Hon. GREG DONNELLY: Without putting words in your mouth, what follows from that? Are you advocating that the companies that are looking to become involved in this industry need to understand that?

Mr DOBBIN: Exactly, most definitely. They should not be labelling everyone the same and we just go in there and do what we want to do. It is about individual people. It is people's families. People on these farms, it is their business, it is where they live. It is very emotional local issues as against the broad picture where some areas may welcome the mining industry. It is different in different areas.

CHAIR: In relation to point No. 4 of Rabobank's submission, you understand that there are differences between the exploration phase and the work that is required and the work that is required for an ongoing production phase. If the whole area of this table was an exploration lease, generally speaking once you get to the stage where you put a well where every glass of water is, the actual environmental studies and all the local studies are done at that location.

Mr DOBBIN: Yes. I am more talking about the actual landholder.

CHAIR: I understand that.

The Hon. RICK COLLESS: You have been in the industry for many years. When we are talking about this issue of mapping prime agricultural land, do you have any suggestions as to how that difficult issue might be resolved? Where do we put the lines and how do we come to a conclusion?

Mr DOBBIN: I think at the end of the day it is in the irrigation land and the prime agricultural land; if you have been in the industry a long time it is probably quite self-evident where those boundaries are. Having said, as I said before, some people may wish that the boundary be extended or whatever the case may be, but you have to make the big decisions. It is quite clear with some of the agricultural land.

The Hon. RICK COLLESS: I am sure that you and I could walk onto a property and say, "This is agricultural land and that's not".

Mr DOBBIN: Yes.

The Hon. RICK COLLESS: But somewhere in between there has to be the line and that will always be the contentious issue.

Mr DOBBIN: Yes, most definitely. It is a difficult task but I think it can be achieved. I am pretty sure it is quite achievable. It is probably self-evident. Once you set the parameters, set your vision of whatever that land should be and then off you go.

The Hon. RICK COLLESS: On page 1 of your submission, talking about this land valuation thing against, is it not a fact that if we were to implement a properly designed and compatible coal seam gas system even on prime agricultural land that could be shown to be non-intrusive to the land and the farming program, would that not provide an income stream to that farmer which is isolated from the vagaries of the climate, market uncertainties and so on? Once it is all operating could that not have the reverse effect and in fact add to the value of that land?

Mr DOBBIN: It could do. It depends. If you go to Queensland some of the wells there, the payments are very different. They are never the same. That is why I am saying that the farmers do not have a lot of power in this. In my opinion we have old legislation in a new world and what we are saying is just try to make the legislation a little fairer. I am sure that if there was no detriment to the security and there was certainty it could, as you rightly said, add value to the land, which would be fantastic for the farmer. But I do not see a lot of evidence of that at this stage. But most definitely it could happen.

The Hon. RICK COLLESS: Do you feel that there is a need for a great deal of clarification of that and maybe even a template type model for compensation?

Mr DOBBIN: For sure, yes. It is like, if you are a farmer you are by yourself and you are pretty lonely and you are dealing with a very sophisticated and important sector, which is the mining sector. They are pretty professional. You do not have a lot of strength. Actually, you do not have a lot of power. For example, if you want to put a well on the property in the middle of your best paddock, if you at least deliberate and say, "Can we put the well over here, which would make my property much more efficient?" That is what I am saying but at the moment they have no power where the wells go. You are just trying to get a little bit more communication between the two. I think that would be a step in the right direction. So the two can work together.

The Hon. Dr PETER PHELPS: Given the choice between the two, do you believe that the bigger threat to agricultural viability in New South Wales comes from coal seam gas or from the native vegetation laws?

Mr DOBBIN: Can you say the question again?

The Hon. Dr PETER PHELPS: What do you believe is a greater threat to agricultural viability in this State—coal seam gas exploration and production or the native vegetation laws?

Mr DOBBIN: That is a tough one.

The Hon. GREG DONNELLY: You can take it on notice.

The Hon. RICK COLLESS: The land values.

Mr DOBBIN: Native vegetation has a dramatic impact on land values.

The Hon. Dr PETER PHELPS: Negative.

Mr DOBBIN: Negative impact, I suggest, similar to coal seam gas.

CHAIR: I guess you could also extrapolate that to the treatment of water licences or water availability or entitlements. If the entitlements are reduced, particularly in lands that are worthless unless they are irrigated, it would also have a large impact.

Mr DOBBIN: Most definitely, yes, for sure.

The Hon. SCOT MacDONALD: Just going through your recommendations, there is a bit of commonality—ease the pace of coal seam gas, slow the pace of coal seam gas, precautionary principles, that sort of thing. I am still trying to get my head around those sort of comments versus your comment in your introduction where uncertainty is a big problem. I put it to you that land values, asset values, whatever are negatively impacted by uncertainty and we have a responsibility to come up with the regulations to move forward with this. Even if some people are unhappy with the outcome, at least the industry, the sector, will have some certainty to move forward and you can value appropriately and all that sort of thing. Do you see the conundrum I am trying to talk about?

Mr DOBBIN: Yes. You are looking for that certainty, is that what you are saying? As a banker for an agricultural property, if I walked on to Liverpool Plains now the first thing I would want to know is whether coal seam gas was going to impact the property. The second thing is how much impact it will have, how will it affect it aesthetically and a whole range of things. The distribution of wells and all those other factors that I mentioned will have a definite impact on you security which often relates then to your serviceability. If you have 15 or 20 per cent of your property impacted through wells, infrastructure, roads, et cetera, you will then have less serviceability. Some of these landholders who may have debt on their property may not be able to service that debt if some of that land is taken away through that infrastructure. But as a valuer you need to know all that so you can then understand and then you can value the property with the full information.

The Hon. SCOT MacDONALD: I will come back to the point we have made numerous times. The exploration phase is an information gathering phase, if you like. Is the exploration phase as big an issue for you? Do you have the same concerns about exploration?

Mr DOBBIN: Of course you do because it amounts to your security being affected. It is whether the client can service the debt. And this can come in pretty quickly. So you may have an exploration stage and at this stage we do not know really what impact it is going to have. They may start in five or 10 or 15 or 20 years time. That is the unknown and that will create uncertainty. It will create uncertainty in the valuation because it will have what I call an imposition on it that this could occur. It is a reality of life that when an incoming purchaser knows there is this uncertainty around that property they will make a factor on to that property prior to the purchase. This is how values are derived. An incoming purchaser will look at that property as to whether there are any impositions. Because you may not get any return. It may impact on your visual and you may not get ample return from the actual coal seam gas.

The Hon. Dr PETER PHELPS: Are you aware of comparable results in relation to wind farms?

Mr DOBBIN: No, I do not know. But the wind farm industry generally speaking paid pretty good returns from the rent. Often it is in areas which are not the prime agricultural land and therefore you might find

there is no imposition. It could actually improve the value of the land. As I said before, if the coal seam gas pays really good returns it can also improve the value of the land.

The Hon. SCOT MacDONALD: In relation to the property rights aspects, we took evidence from people who wanted wells on their property for all sorts of reasons—they were not actively farming or it might have been marginal country or perhaps native vegetation had an impact. I am surprised to hear a banker talk about putting some impediments on property rights. I thought property rights were fundamental to our whole banking system. I hear what you say about prime agricultural land and attempts to ring fence it, but there are difficulties with that. Do you accept that you cannot do that sort of thing without having some impact on property rights?

Mr DOBBIN: In regard to being inside the zone or outside the zone?

The Hon. SCOT MacDONALD: Having barriers put up to prevent someone making an independent decision or a cooperative arrangement with whoever to do what they like with their land. We have heard for decades that people must be free to do what they choose to do with their property and they get very upset if there are any impediments, such as water reform.

Mr DOBBIN: I understand. What you have got to think is, as you know, the agricultural land is declining every year. In Australia it is about 1 per cent per annum that it is declining. It is declining around the world by 1 per cent per annum. That is arable land.

CHAIR: A point of clarification: that is 1 per cent of the available land per annum?

Mr DOBBIN: Yes, for arable land. As you know and there is a lot of talk about it, we have done a lot of research into the fact that there will be an impact on food and it is coming very quickly. I think there will be 400 million middle class by 2020 in the Asian countries. If you have got prime agricultural land, to me it is very important to preserve that. I will give you an example. Often a lot of councils will say you cannot subdivide agricultural land into small hobbies farms so that they can preserve it. Sometimes there are conditions that take away people's rights as you quite rightly say, but I think the big picture here is about protecting some of the most pristine areas in Australia. A lot of the Liverpool Plains and even up to the Cecil Plains in Queensland are really prime lands that we should protect for our future. That is all I am saying. I am sure we can live with the mining industry but we have got to be careful to preserve the integrity of those regions.

The Hon. SCOT MacDONALD: I will finish extrapolating your recommendations. You see the potential for coexistence if we can get those things right. That is, protection of the water resource, whether it is ground or surface, and no impediment on the efficiency of the farm. If we can get those safety guidelines there you see potential for coexistence?

Mr DOBBIN: I can see potential for coexistence but remember agricultural is a very—I think there was a question earlier about irrigation land. When you are doing precision farming it will have an impact particularly if it is on your prime land. How you avoid that I am not so sure. Having said that, full compensation must be paid for the loss of production in an area capable of use. At the end of the day it is like taking your lounge room away: you want to be compensated. If you are taking someone's livelihood away or part of their assets, people should get compensated. That is what we are saying.

The Hon. SCOT MacDONALD: There is a provision in the Petroleum Act for a veto over cultivated land.

Mr DOBBIN: Yes.

CHAIR: You mentioned the statistic that arable land worldwide is declining by about 1 per cent per annum. Do you have any statistics on the actual agricultural production worldwide, is it declining or increasing?

Mr DOBBIN: It is increasing but it is decreasing at a lower rate. It was decreasing at a higher rate than the growth but now the genetics will change it. Everyone knows the story about the 6 billion people going to 9 billion people. Genetics will cover most of that. Improvements in genetics will continue to improve. But now they are not so sure whether the genetics will keep pace, whereas probably recently they thought genetics would keep pace with the 9 billion in 2050. What they are not sure about is whether we can feed the 400 million new middle class in China, India, Indonesia and the Asian countries between now and 2020.

CHAIR: Because the consumption will go up?

Mr DOBBIN: Higher proteins, higher grains. They are requiring similar diets to us. That is the big issue today. But genetics is increasing and improving and will cover most of that 9 billion increase, if you like.

CHAIR: Has the Rabobank undertaken any face-to-face discussions with the Australian Petroleum Production and Exploration Association [APPEA] or some of the large gas miners to flesh out some of your concerns and hear what their views are?

Mr DOBBIN: No, I have not.

CHAIR: Do you think that would be positive?

Mr DOBBIN: It could be a good idea.

CHAIR: From the point of view of informing your bank it would be best to get ahead of the game.

Mr DOBBIN: Yes.

CHAIR: Mr Dobbin, thank you for agreeing to attend and for your excellent submission. As I have said to previous witnesses, we like submissions that put some recommendations on the table. Ladies and gentlemen, I will call this seventh public hearing to a close.

(The witness withdrew)

(The Committee adjourned at 5.55 p.m.)