

Surat Gas Project

Community information sessions 22-26 November 2010

In November 2010 Arrow Energy held a series of community information sessions to discuss the Surat Gas Project. Questions and answers from those sessions were captured by JTA Australia and are presented in this document.

The purpose of these meeting notes is to reflect the questions asked and answers provided during the community meetings. The notes are based on a written record of the questions raised and include some paraphrasing and summarising; every effort has been made to preserve the integrity of discussions. Where the same or a similar question has been asked in other sessions, the most complete answer has been provided.

Questions varied across the seven sessions. To ensure that valuable information is shared throughout the communities of the Surat Basin, these notes summarise questions and answers asked across all sessions.

The Surat Gas Project community information sessions were held from 22 to 26 November 2010 at:

- Wandoan 22 November 2010
- Miles 23 November 2010
- Chinchilla 23 November 2010
- Dalby 24 November 2010
- Cecil Plains 24 November 2010
- Millmerran 25 November 2010
- Goondiwindi 26 November 2010.

The project is Arrow's largest gas exploration and development program in the Surat Basin. The proposed project involves continued exploration in the Basin to identify the most economic and environmentally acceptable areas for future gas production. The areas covered by the project extend from Wandoan to Dalby and south to Millmerran and Goondiwindi where Arrow holds petroleum tenure and environmental approvals for exploration.

How to read these notes

Questions and comments from the audience are in bold type. The unbolded responses are from Arrow staff.

In some cases responses have been summarised. Where one response to a commonly-asked question was more comprehensive at one session than another, the more detailed response has been used in the interests of better understanding. In some cases, additional information is included to provide further context or explanation; this information is in brackets within text, or italicised following the answer.

Arrow will hold another round of consultation sessions in the first half of 2011 to update the community re progress on the various issues raised. Arrow will release further information closer to the time. If you have questions or comments about the project, the meeting notes or you would like detailed maps, please contact the project team during working hours on:

freecall 1800 038 856

email: suratgas@arrowenergy.com.au

post: Surat Gas Project, Reply Paid 81 Hamilton QLD 4000

Acronyms

BTEX	Benzene, Toluene, Ethylbenzene, and Xylene
CSG	coal seam gas
DERM	Department of Environment and Resource Management
EA	environmental authority
EIS	environmental impact statement
LNG	liquefied natural gas
QGC	Queensland Gas Company
QWC	Queensland Water Commission

Conversions

1 kilolitre = 1,000 litres

1 megalitre = 1,000,000 litres

1 gigalitre = 1,000,000,000 litres

Queensland Government Acts mentioned:

Petroleum and Gas (Production and Safety) Act 2004

Mineral Resources Act 1989

Water Act 2000

Water Safety (Reliability and Supply) Act 2008

Wandoan

Date:	22 November 2010	
Venue:	RSL Sub-branch, Heeney Street	
Facilitator:	Jan Taylor, Principal	JTA Australia
Presenters:	Al Mueller, Vice-President Operating Services	Arrow Energy
	Tony Knight, Vice-President Exploration	Arrow Energy
	Darren Stevenson, Asset General Manager South	Arrow Energy
	Carolyn Collins, Environment Manager	Arrow Energy
Other speakers:	Leisa Elder, Vice-President Community and Corporate Affairs	Arrow Energy

1. I was interested in the result of the water tests from the Origin Talinga Environmental Authorities (EA) and the effect on the Condamine. The list included mercury, lead, uranium and BTEX (Benzene, Toluene, Ethylbenzene and Xylene) chemicals. Are these found in coal seam gas (CSG) water in your areas?

Mercury, lead and uranium are naturally occurring elements and are found in trace amounts in most parts of the earth, including the sea. Modern testing techniques can pick up incredibly minute amounts of these elements. However, its concentration level is most important. Apart from natural occurrences, in many areas there will be a legacy of the introduction of such elements into the environment via human activities.

In the past we haven't normally conducted detailed chemical testing of coal seam water samples; however, we are moving to that stage given the amount of water that is likely to be produced, and recognition that it is a matter of concern to the community. Our approach to date has been along the lines that since coal seam water has been used in this region for many years before CSG came along surely its effects would have already been seen if there were any.

The BTEX issue is somewhat similar, in that in spite of recent media attention in relation to fracking in the USA Arrow has not fraced in the Surat Basin so we haven't tested for its presence. We are now conducting testing for BTEX as a matter of routine, and would point out that benzene, for example, can be naturally occurring in hydrocarbons. Benzene is present in high concentrations in exhaust from petrol combustion, and is also present in, or produced during manufacture of, many man-made products.

2. Do you test each bore when you drill a well?

We have tested most of our wells as we drilled them. However, the extent of analysis has changed and in the future we will test more than previously. The testing is more focussed on usability of water i.e. salt and other elements in the water. With regard to BTEX chemicals, Arrow hasn't fraced in the Surat Basin therefore we haven't tested for these chemicals. Benzene was found in the Bowen Basin and the sources of benzene can be natural or from the drilling process e.g. the grease used. With regard to water testing, Arrow is expanding its program on producing areas at the moment. The Department of Environment and Resource Management (DERM) has taken samples from dams and reverse osmosis plants and a lot of people take water from the Walloon Coal measures as we do and the water isn't particularly nasty.

3. 'Make good' is a great concern if it is decided that CSG has impacted the water supply over a period of 15 to 105 years. If a bore deteriorates after the incursion of gas activity, how will you make good? A DERM representative in Wandoan said government will not guarantee to issue a licence from the Artesian Basin on the basis

of make good arrangements. Who decides? What do you have in mind to make good?

The onus is on Arrow to investigate such matters as:

- testing the bore to see if it is functioning
- understanding the regional area through modelling
- determining if any impact is from the CSG industry as it may be seasonal, drawn down over time and from other industries
- satisfying the Queensland Water Commission (QWC) that we've met our obligations.

There are a number of options for 'make good' e.g. domestic or stock supply where you don't need an allocation. Finally, if you are unhappy with a decision it can be appealed through the QWC and the Land Court.

The specific answer to 'who decides' is the Queensland Water Commission. 'Make good' includes various means to replace, restore, supplement, substitute or otherwise maintain a groundwater water supply and/or associated infrastructure.

4. But you must have a licence, there are no volumetric allocations?

No entitlements will be forthcoming. It is important for us to look at the water balance model. ReInjection is an option and substituting some supplies would mean less strain on other aquifers. We are looking at a number of mitigation measures.

'Water balance' refers to the concept of maintaining the gross amount of water in a region, i.e. water both above and below ground in that same region over the long term. Put another way, it does not consider 'disposal' of water in terms of deliberate evaporation or transport to other regions. The distribution of water in the region may change temporarily while we are pumping it from coal seams, but the amount of water will not.

Pumping of CSG water is not managed by a licence in the same way that irrigation entitlements may need a licence, but is still very heavily regulated and controlled by government.

5. What happens if the bores go down, do cattle die?

We are fully conscious of the absolute importance of water to agriculture and grazing activities. If our activities were creating conditions that would lead to such dire circumstances then, apart from putting in place preventative measures in the first place, we would stop and then work out how and/or if we could resume works without causing harm.

6. You don't monitor our bores daily [comment]**7. If I sell my property, who is responsible for informing the new purchaser of any agreements I have with Arrow?**

The transmission pipeline will be an easement on a land title. Compensation is not be listed on a title but the petroleum tenure is. A solicitor will find that information when doing searches for the purchase of the land, or you could contact Arrow directly.

8. Does Arrow contribute to the local council for road maintenance?

Yes we contribute to the Western Downs Regional Council for a road maintenance program.

9. How do you differentiate between intensively farmed land and legume land?

The difference between well-managed pasture and intensively farmed land is not about what effort goes in to farming the land but the impact of the CSG industry. A floodplain is the biggest indicator of intensively farmed land and has the biggest impact. Other lands are not as fragile as floodplains.

10. There's no irrigated land in this area (Wandoan) at all, but wheat land is still good farm land.

We agree, and recognise the value of all the differing forms of land use across this district. We think that our proposed developments can be planned and managed in such a way that they cause minimal lasting impact on the land.

11. The contractors laying the export pipeline of Queensland Gas Company (QGC) are proposing double jointing 18 inch pipes which require the pipe to be moved along the pipeline easement rather than local roads. If this was the case with Arrow will you go back and renegotiate with the landholders who have compensation agreements with you and compensate them commensurate with the extra traffic that will be required to allow that process to happen?

Yes, if there is change to the disturbance on a particular property such as double jointing Arrow will revisit the landholder and compensation will match the increasing impacts.

12. Does Arrow have a community investment program? If not, why not? If so, how does it work and how do we get in contact with it?

Yes, Arrow has a program in Dalby which is being extended to Moranbah; it will be on a much larger scale in 2011 and will be made public in the New Year. You can call 1800 038 856, email communityinvest@arrowenergy.com.au or visit the Arrow website http://www.arrowenergy.com.au/page/Community_Information/Community/ to find out more. It includes the Brighter Futures program which looks at health and education and other matters. We invite people to put forward their plans for consideration.

13. I live on an 80 acre piece of land near Chinchilla and Tara. In regard to what's in the water that comes up with the gas, and extraction and drilling processes, how long have you been in the industry?

Eight years in the CSG gas industry and seventeen years in the coal mining industry (*response from the speaker, Tony Knight*).

14. When did you realise in those seventeen years that BTEX was carried in coal?

A couple of weeks ago when we did some recent testing in Moranbah.

Arrow suggested that the profile of the BTEX group of chemicals has been raised very quickly in recent times, stemming from concerns raised overseas. The time lag between recognition of its potential presence in Queensland, measures to check for its presence, and a ban on those products which may contain it, has been very short and a credit to the government agencies involved.

15. When you plug a well after it has finished its production life and you cement it, does the cement last forever?

It's certainly long-lasting cement but as for forever, it's hard to say because the industry hasn't been around for that long. However, it certainly lasts decades if not more than that. The cement is underground and not in an oxidising environment so that once the well is sealed and backfilled oxygen cannot get in. Degradation of that material will therefore take a very long time.

16. In 2516 will it still be plugged up nicely?

I can't profess to know that, no one can.

17. It's taken millions of years to get to this point where human beings can extract water from the aquifers, and if we are going to compromise that in the next 50 years, without knowing what it's going to be like for the next 1000 years, it doesn't make sense to use this cement that you don't know will last 50 years.

Structures that people have created such as Pompeii, the Pyramids etc. are thousands of years old; some of those contain cement and are still standing today.

18. At what point will humans not need aquifers?

We will need aquifers. What we are putting into the ground is solid material, it can't go anywhere, it's a plug that will sit there.

Today on the radio, Mr Henry, the (*then*) Treasury head asked why we are rushing to get all this coal and gas out of the ground because in 100 years' time it will be gone? Why doesn't the coal and gas industry stagger extraction to prolong the life of the resource?

Australia has huge coal and gas resources which will last hundreds of years. That is not the case around the world. Countries like China, India and other developing countries have growing populations and they have a demand for this energy which is the driving factor. We will see a transition to other fuel sources, perhaps ten, twenty or forty years away. We will have to cover supply until then until we have a better system in place.

19. Reading from your publication *Water and Salt Management* as a minimum standard, Arrow will remove the salt it produces and dispose of it in an approved and regulated landfill outside the operational area. Where is there a regulated landfill, I haven't heard of one? It wouldn't make me happier to know that Arrow is taking that landfill and putting it on our next door neighbour's land or taking it out of the area or even into NSW. Outside the operational area would seem to be irrelevant. The other calculation that concerns me is that there is 5,000-8,000 kg of salt per megalitre of coal seam water. The amount of salt is a very large amount, a 15 hole pilot plant is expected to produce between one to three megalitres per day of actual outflow. The calculation of between 5-24 tonnes of salt per day from 15 holes means we are talking thousands of holes. Where will we have regulated landfills with sufficient capacity to store the salt generated by any or all of the CSG companies, and will there be enough that are big enough?

In answer to the question about 'where is a regulated landfill' the regulator (DERM) has a process to review and approve applications for waste disposal sites. An example of a non-regulated waste disposal site can be found at <http://www.derm.qld.gov.au/register/p01312aa.pdf>. It follows that a site could be established at a suitable place, provided it met regulatory requirements.

Arrow's preference is not disposal but beneficial use of the salt. We are looking at a commercial market for the salt, and are working with other companies to attract a suitable chemical company to establish an industry based on use of the salt. Clearly the management of salt will be critical, and there will be times when salt may need to go in temporary landfills that can be accessed in the future.

20. How can we have confidence in the safe storage of the salt knowing that it may take a lot longer and there may be more salt?

For the period of time it is in our dams we have strict requirements for construction of the brine storage dams. This includes secondary containment systems, leak detection and seepage return systems if there is a leak. Annual audits must be done by third parties and the integrity of dams are assessed and certified at that particular point in time. There are strict requirements on regulated landfill, similar to agricultural chemical waste and we need to meet the same design standards as those particular landfills so that salt is contained. There are some industries closer to Brisbane that currently take salt but they wouldn't have the capacity yet for what is required by the CSG industry.

21. Our generation has been in trouble for mass tree clearing and we have learned through land care to have better management and cannot legally cut down trees. Why does the gas and coal industry get away with it?

We are in the same situation when it comes to vegetation clearing, we are not exempt. We have to get approvals as you do.. The *Nature Conservation Act* and protected plants regulations all apply to us. We need specific approvals if we do need to clear some vegetation, whether an endangered regional ecosystem or some other protected species; in those circumstances we are required to enter into an offset arrangement. We have hired a team of botanists and ecologists who are sent out to each site before we clear any well sites, gathering line sites, and any pads for any construction we want to do. We need a record of that clearance and we need a licence.

22. I'm concerned about plastic lined ponds as we have found with QGC's ponds that animals have been sliding down and drowning. The ponds should be well fenced and materials put over the plastic to allow animals to get out.

We fence our ponds both when in use and during construction of the dams as well. It's a requirement of the Environmental Authority (EA) that they must be safe for livestock and native wildlife. We install 'critter' mats to enable them to get out of the dam.

23. In this week's *Country Life* farmers are very nervous about CSG and the water situation. I believe the Environmental Protection Authority (EPA) doesn't have any teeth to fine the companies who pollute or make mistakes or bugger up the water system.

That is something the government has to deal with. The government has been recruiting more compliance people. The risks for us in being found guilty of causing environmental harm are very serious, and consequently something we take very seriously. The impacts on our business can include fines, loss of tenure, difficulty or inability to obtain new tenure, reputational damage for lenders etc. All these make running our business difficult if not impossible. It is not something we want or choose to do.

24. In Mt Isa there is a situation with raised lead levels in the kids' blood. Originally it was stated it was probably not caused by the mine but now the doctors have said it is linked to the mines and the company concerned says it has complied with government regulations. In years to come, if it is the same situation with Arrow, will you take the moral high ground and stop doing something you are allowed to because it will cause harm, or will you hide behind government regulations? Will you take steps above and beyond what you have to do to ensure public safety?

Yes, if we are having an impact on people's health we will stop that activity.

Miles

Date:	23 November 2010	
Venue:	Leichhardt Centre, Columboola Function Room	
Facilitator:	Jan Taylor, Principal	JTA Australia
Presenters:	Al Mueller, Vice-President Operating Services	Arrow Energy
	Tony Knight, Vice-President Exploration	Arrow Energy
	Darren Stevenson, Asset General Manager South	Arrow Energy
	Carolyn Collins, Environment Manager	Arrow Energy
Other speakers:	Leisa Elder, Vice-President Community and Corporate Affairs	Arrow Energy
	Iain Burgess Project Manager Central Qld Pipeline	Arrow Energy

1. You mentioned compensation for landholder's time, is that prior to the Land Access Compensation Agreement being signed? Can you elaborate please?

We do make provision for the time involved in discussing and agreeing the terms of access as part of our compensation agreements

2. Is it a standard procedure that Arrow uses?

Yes, we recognise that it is essential to discuss various matters when talking about compensation.

3. With the disposal of salt and brine, where will you take it if you can't sell it? It's your responsibility not to contaminate the river systems.

In answer to the first part of the question, Arrow would take it to a regulated landfill site. There is a process to work through with DERM that would allow different sites to be considered as potential landfill sites. So it may be the case that the site doesn't exist yet, but Arrow could, with the right environmental considerations, develop one in future. Re the second comment, we do not plan to dump salt in a river as a solution.

4. The water pipeline will go down stock routes and road reserves and this can be detrimental to the environment. There are some very good stock routes in Taroom Shire which we don't want plugged up with pipelines. What is Arrow's plan?

It is very unlikely that we would simply choose to follow stock routes and road reserves as the normal situation is to try to make the pipeline as short and direct as possible. The plan with pipeline locations is to select a route that causes the least impact while maintaining the most direct line. Don't forget pipelines are buried so it is possible for cattle to graze above them.

5. The dams, and dam reconstructions, aren't evaporation ponds are they...because they have been phased out?

Correct. The government is forcing the CSG industry to a water solution that favours 'beneficial use', and to find ways that maintain the overall balance of water in a region, rather than removing it from the region. Evaporation, because it effectively 'removes' water from a region, is not preferred and large evaporation dams are being phased out.

6. What amount of gas needs to be extracted from a hole for it to be commercial and how much water is extracted at the same time?

The simple answer is that there needs to be enough gas extracted to cover the capital investment and operating cost of the well; in the same way that any investment needs to return a profit. We work on a rule of thumb that each well should return at least one to two

petajoules of gas. Most of the gas from a well is recovered in the first seven years or so of its life although gas will continue to be produced for up to fifteen or twenty years.

The amount of water extracted will vary over time. The peak water production period is early in the well life, and it declines quite rapidly over its lifetime. In the Surat Basin some wells can produce 1,000 barrels of water a day or more (one barrel is about 160 litres), although this drops down to about 100 barrels a day or even less after a fairly short period.

- 7. When negotiating agreements with your company, you have a whole lot of power but individual landholders don't have the same capacity as your company. We don't want to go to dispute so this will push us towards settlement. When you set up in an area couldn't you get all the farmers/growers together and provide the names of all the farmers in our area and negotiate group agreements? You labour the point that the government is involved but it is nothing but a facilitator to the gas industry. We don't think government is on our side. We would have financial support if we could gather together; we don't want to see the Great Artesian Basin destroyed.**

We most certainly try to use a standard approach to negotiation and compensation so in effect we do treat landholders who use their land in a certain way (e.g. cropping vs grazing) on the same basis. We wouldn't be against the idea of collective negotiation, just as long as people understood that, depending on various matters such as the degree of impact on land, the land use etc, that different amounts would be payable.

Re the comment about government, you can be assured that it takes very seriously its duty to represent the interests of both industry and community. It is trying to find a solution that provides a 'win-win' situation, where both sides can get on with their business without stopping or harming the other.

Re the Great Artesian Basin, we need to keep in context the size and complexity of it, and not simply assume that the actions of the CSG industry can destroy it. The GAB covers most of Queensland, and extends into the N.T and S.A. It has all sorts of inputs, and suffers all sorts of impacts, and it is unfair to say that the CSG industry alone will somehow destroy it.

- 8. If you drill where there is surface water or bores, does your company propose testing the water? Would you pay for independent testing?**

Yes, we clearly recognise the importance of, and concern for, groundwater and will make sure that we gather information about it from all sources. The whole debate about water needs facts and good science, and part of that is sampling and testing.

We will pay for testing that links into our broader program of understanding and studying the groundwater system. We won't just test bores in isolation, since random points will be meaningless unless we also understand the history, water use regime, seasonal fluctuations and other relevant considerations.

- 9. Will you give results prior to drilling? I would like to know the quality prior to you entering my property. If I would like a series of tests prior to you undertaking drilling, will you do independent testing?**

We will talk to you about that at the time of discussing access and compensation. We are required to obtain certain information from landholders about bores, and the information is then shared with the government (via DERM and the QWC). We are also obliged to do water sampling if you believe we have impacted your water bore.

- 10. With compensation for time given by a landholder, do you have a fee structure, an agreed rate, a standard format in train?**

This will be built into the compensation agreement. It's not *carte blanche* where one landholder contributes 1000 hours and another 10 hours; there is a standard amount of time for the preparatory work.

11. We have 400 megalitres of storage and some of the catchment is outside our property boundaries but is bore-driven. My concern is if we don't have testing in place prior to development what proof do we have that there is any impact?

Those baseline assessments will be done prior to drilling and the ongoing monitoring should give you comfort. If there is a change in the waterline or an indication of some impact then we will undertake more sampling. We will sample if you think we have affected your dam. The difficulty is the number of dams and water courses out there. We don't need to carry out additional monitoring for each landholder.

12. Therefore there is nothing in train at the moment?

There are very few areas we operate in at the moment. As we expand, the same program of testing will be implemented.

Arrow is still very much in the exploration and environmental investigation stage of its works. We don't have widespread production just yet, and our works at this stage are mainly about setting in place the right testing and monitoring systems.

13. Our water supply is stored perfectly safely but I get the feeling that as the CSG process goes on, the artesian water will decline. You are offering treatment of the water coming out and infrastructure will be established. However, I think there will be no compensation as the government thinks the water belongs to it. I don't think you could replace it. You could truck it in but what are the alternatives? We know it will drop and water quality will deteriorate, it's just part of the deal.

Our aim is to preserve the overall balance of water in the region, both surface and groundwater. The challenge we are currently investigating is how we can conduct our activities and not have a detrimental impact on current land use. If our works, or our future monitoring, showed that we are having an impact (or could do so), then we either would not start or would stop.

I would ask that people give us the chance to complete our studies of how the water balance can be managed, and then decide on the basis of facts. Arrow is not rushing this process, and is taking the time to get the right information, and the right answers.

14. All landholders should be met and negotiated with as one entity. You pick us off one at a time, we should stick together. Legislation is drawn up by the state government which is broke and errs on the side of the gas company. Arrow was on our property eight months ago and cleared 50 acres of prime timber. If I'd cleared half an acre I would have been in the Magistrates Court. The state government wants every cent it can get. There's one rule for you and one for us. The Surat Basin project will end in tears for everyone. Companies will get into deep strife and will go into liquidation.

We understand your concerns. With regard to one rule for us and one rule for the community, we are burdened with lots of legislation. We don't get special treatment. We have to go through a rigorous process to clear land and engage botanists, cultural heritage experts etc. We have to look at environmental impacts and we consult independent groups. We are bound by the *Nature Conservation Act*. The government is trying to balance the needs of the community with trying to create wealth for the state. The issue is that the industry has grown faster than the wheels of government can turn. Different CSG groups meet government regularly here. You should give government some credit; it has resourcing issues, money issues. There shouldn't be a negative view of government as it tries to balance the interests of all parties, including those trying to develop new industries.

In addition to government requirements, we have a very rigorous internal process before a financial investment decision is made. For example with groundwater there is a detailed plan for flow monitoring and what we would do if we see changes. We would put mitigation measures in place to maintain the water balance. Regardless of government requirements, we won't take that risk. We have to be confident that we can manage the impacts.

With Shell and Petrochina, reputation is a big deal. They have all sorts of projects they could spend money on and they wouldn't take the environmental risk. You should have some confidence in the company; it wouldn't make sense for Arrow to take that risk.

15. There's a risk that the company could go belly up?

I can't imagine any scenario where these companies could go belly up, since Shell and Petrochina are in the top ten biggest companies in the world. They can't just run away from an issue, as it would prevent them from being trusted or allowed to undertake new projects, either elsewhere in Australia or internationally. Big companies do not run away from problems. As an example, BP in the Gulf of Mexico cleaned up and compensated for the effects of its oil spill. BP is paying out billions to get the community back on track.

16. A number of years ago we freeholded our properties which gave us rights and responsibilities. Since then we have seen our rights eroded by government; why is it that CSG prospecting rights can't be eroded? Why can't we receive compensation too for prospecting and receive royalties?

The Crown owns the gas or mineral rights under the land, and is the only party able to demand a royalty. We only have a right to explore or produce subject to government approval.

CSG prospecting rights are eroded. The right to explore is bound by very strict conditions to relinquish ground on a regular basis, and production leases have a finite life. Also government can take away the right to explore or produce if we are found to do the wrong thing.

In terms of compensation, we do compensate for coming on to your land, whether it be to explore or produce gas. We are familiar with the 'royalties for regions' campaign, but it is outside our control and we can't influence it.

17. Nobody wants to buy our properties because they have been devalued. Why can't there be some royalty payments that would increase the property value?

The royalty issue is for government to address. In terms of property value impacts, in the Bowen Basin some properties are advertised with gas wells as another source of revenue, and this is used as a selling point. In those cases there is a compensation payment every year so there is a benefit which can carry people through hard times.

18. I have two gas pipelines through my property and the lack of maintenance is shocking. The APA Group (APA) own the pipeline and have caused erosion and introduced noxious pests without compensation. We end up having to clean up their rubbish and get nothing in return.

As a pipeline owner we have responsibility to maintain the pipeline and our own integrity management system requires this. Erosion caused by the pipeline would be our problem to rectify.

The pipeline is the key asset linking our fields with the liquefied natural gas (LNG) plant. The integrity of the pipeline is very important to us. Employing the landholder to monitor it is something we would consider and we could enter into an agreement to compensate you for fixing it (if that suited both parties). With regard to noxious weeds, our plan is to start pre-emptively, spraying weeds before construction to stop the spread, not least because it only

causes maintenance problems for us. We also take routine measures such as washdown and inspection of vehicles before they enter properties.

19. Will you wash down your vehicles?

Yes, we wash down our vehicles. This topic is discussed in the Land Access Code developed by government, industry and landholder representatives.

20. As part of the Land Access Code, it is your duty of care to stop the spread of weeds so the landholder has the right to ask for proof. Where do you access your water for washdown?

We either bring water in or else establish an arrangement with the landholder for access to water. A special washdown facility is created, including temporary washdown facilities. We use various means to minimise vehicle traffic onto properties too in order to reduce the chances of spreading weeds.

21. You will need drillers. Will you import skilled workers or will they come from the community?

The preference is to use local workers but it is a social issue about where Australians want to live. We can encourage people to live in certain towns but we can't force them. We can provide encouragement and endorsements. In the Bowen Basin a lot live in Moranbah and in Dalby a majority are locally based and live in the town e.g. diesel fitters, farmers' sons, main drillers and we also have hired staff to live locally. Key contractors have encouraged staff to live in town. For development in the future we would look at the most suitable base; this could be Miles or Wandoan as they have the necessary facilities.

22. Legislation requires that the landholder has to prove the company intended harm before compensation is paid?

Under the *Petroleum and Gas Act* the basic principle is that the landholder cannot be worse off. The burden of proof is not on the landholder. We agree up front what the compensation will be before works commence.

23. It's been in the rural press.

We will check on that, but would also point out that the media does not always properly research and report the facts of every matter, which I am sure will come as no surprise to many people.

24. The first thing that APA did on pastures was to grade the land where the pipeline went through.

This is one of the reasons why we like to hire locally because locals understand land use.

25. Shonky contractors have been employed for maintenance work; they cut chains on gates when they don't bother to get the key to open it.

There is a selection process for Arrow contractors as we do not want that sort of behaviour. If there is a breach of one of our land access rules we would investigate and it could result in dismissal. We are aware of the contractors you are talking about. Those are culled out at the first point. This is a \$2 billion project and is very important to us so we don't want contractors of that nature.

26. With regard to royalties for the 300,000-500,000 cubic feet, how much do you pay to the government?

We pay 10% of what is termed the 'wellhead' value of gas produced. This allows for deduction of the costs of establishing the well, in the same way that most businesses can claim against income in some form.

27. Benzene might be in coal, is that right?

Benzene can occur naturally in hydrocarbons, and coal is a hydrocarbon. The amounts are likely to be very low. It is worth noting that research has shown that some soft drinks contain benzene, and that most of us will be exposed to benzene each time we are exposed to exhaust fumes.

28. You are saying it won't be a big thing; if you bring up water, how contaminated will it be?

People have been using water from coal seam aquifers for a long time so we believe that the real test has already been conducted. If there was naturally occurring benzene at levels that harmed people or the environment then the problem would have well and truly been evident in the Surat Basin by now, and certainly well before the CSG industry started.

Apart from the fact that we believe the contamination will be either zero or extremely low, we isolate the water and monitor the chemistry of that water and it is contained, treated and managed. We would not release contaminated water.

29. With regard to insurance, what happens if someone gets injured on our property?

The liability is with us. If people are on your property on our behalf the responsibility is on us. We are bound by government regulations and the responsibilities are under our tenure. It extends to injuries whether environmental or to people. It's not linked to the landholder.

30. We had an environmental man drilling through a neighbour's fence; lights were shining day and night.

We do not intend to drill on small one acre blocks but away from homes at a minimum distance. If it is outside our boundary zone we would look at the impacts and have barriers around drill sites.

31. I can't get any information from anyone about burning coal seam gas. What is the procedure and how long do you burn gas to see if the well is viable?

There is no specific answer because it depends on the behaviour and results from the individual pilot wells. As a guide, the pilot testing phase typically takes one to two years and therefore it would be burning for that length of time.

Chinchilla

Date:	23 November 2010	
Venue:	RSL Sub-branch	
Facilitator:	Jan Taylor, Principal	JTA Australia
Presenters:	Al Mueller, Vice-President Operating Services	Arrow Energy
	Tony Knight, Vice-President Exploration	Arrow Energy
	Darren Stevenson, Asset General Manager South	Arrow Energy
	Carolyn Collins, Environment Manager	Arrow Energy
Other speakers:	Andrew Faulkner, CEO	Arrow Energy

1. How many people here tonight have been compensated for their time?

We do build in compensation for time given in discussing land access agreements but not for community consultation events.

2. What is put in with the water used for drilling? If you ruin the underground water supply either by polluting it or diminishing the supply, how will you make good?

The drilling additives we use are natural products, e.g. cellulose and bentonite which are naturally occurring plant products. We will put them onto our website and show what the products are.

With regard to making good, that depends where you are in relation to the activities and the extent of the activities. We are trying to understand how the aquifers respond to our activities and are monitoring their behaviour. We want to understand the changes over various aquifers before there is a significant impact. If the impact is too great then we won't continue our activities; we must prevent this from occurring.

3. You mention that contractors have been dismissed, shouldn't you have an up to date mapping system? (This question referred to previous information provided by Arrow to the community).

We have publicly said we have made mistakes before; we are upgrading our geographic information system at the moment.

4. Lie number 1 was that more than one vehicle entered my property and washdown wasn't done? (This question refers to a long standing incident with one particular landholder. The matter has been raised and addressed both directly and in previous consultation sessions)

We have written and apologised to you and have donated monies to the school of your choice. You have spoken to the CEO of Arrow and it wasn't appropriate the way you spoke to him. We have had many discussions and I thought we had closed this issue off.

5. With regard to overlapping ATPs , how can we find out who else has ATPs over our property?

You can't have overlapping Authorities to Prospect (ATPs), but there can be overlapping petroleum and mineral tenures, since they are provided for under two different Acts. Coal companies such as Cockatoo and Xstrata can have mineral tenures over your property, and at the same time there can be petroleum tenures. You can find this information on what was previously the DME (Department of Mines and Energy) website and now is DEEDI (Department of Environment, Economic Development and Innovation):

http://www.dme.qld.gov.au/mines/tenure_maps.cfm ; this is an interactive mapping system. The websites are also on the fact sheets. The Department will carry out property searches.

You can also contact the Department of Mines in Dalby, 07 4624 1512 (Janet Hogarth, Mining Registrar) janet.hogarth@deedi.qld.gov.au.

6. Because there is no legal distance required for you to be away from a residence, is there any legal framework stopping you from putting a drilling rig in the car park here?

We need to comply with the safety provisions of legislation based on minimising risks to as 'low as reasonably practicable'. On the grounds of safety alone we would not choose to drill in an area such as a carpark.

7. Do you make tens of millions of dollars per year out of each well?

No, absolutely not. Coal seam gas wells do not produce a huge amount of gas per well, which is why we need so many. However, this means that the amount it costs to drill the well versus how much we get for the gas in return only provides a fairly slim margin. We certainly don't make tens of millions per well.

8. We have a common interest in underground aquifers, especially in agricultural areas and you can't be surprised people are very concerned. The drawdown on accessible aquifers is well known. There will be a pin cushion of 40,000 wells and you can't believe every aquifer is cemented off from the drawdown of CSG water. How do we know about the interdependence, how much do we know about the sediments and contamination. There are real concerns about the succession of aquifers and that the Great Artesian Basin will never be reinstated.

We are very aware of the importance and sensitivity about water and the Great Artesian Basin. We strongly believe that the way we design and construct our wells ensures that they will not allow connectivity for water.

We are also very conscious of the need for good science and facts in understanding water, and things like connectivity of aquifers. We are doing this work now as part of our EIS studies. However, due to the sheer size and complexity of groundwater regimes and the GAB, no one can ever be 100 percent sure about how they will act over time which is why we are committed to putting in place monitoring systems. That way, we can check and adapt our activities based on real findings.

As a company, we fully understand that we need to get this right, and that if we don't, or we stuff it up, then we don't have a project or a business. We are sure that we can get the necessary answers.

9. With regard to tenure, access and compensation, some landholders don't own leasehold land. For a million dollars and upwards there is a contribution to the Crown for tenure security. If compensation was realistic landholders would be encouraging companies onto their land; clearly we are not being compensated enough. As you convert to freehold tenure all rights are taken away by the Crown and you only have interest in the topographic layer. Our tenure doesn't have mineral or mining rights. There is a community obligation to pay \$1,000,000 for security of our tenure.

It is clear that ownership of minerals and the rights of the Crown are not things within our control. The Crown has ownership of the minerals and petroleum, and Arrow pays the Queensland Government for the right to explore for petroleum. We can't pay landholders royalties on gas we produce, but we do pay compensation.

In terms of the amount of compensation, we are running a business like many people here do. We can only pay a certain amount, and we use independent valuations to work out what

is a fair price for the impacts we have on the land or business. Our aim is to achieve a fair balance between the interests of landholders, who as you say own the top of the land, and the interests of the government which wants the economic and social benefit that comes from extracting valuable mineral and petroleum resources. We believe that with good planning and conduct, and with a long term view of 15 – 25 years, that we can come in, recover the gas that society wants, and then leave the land in much the same way as we found it.

10. Have you as much ready access to state forests, stock routes, roadways, national parks etc as you do to freehold land?

No, not in these areas. National parks are off limits and roadways present safety hazards. Stock routes are normally subject to native title so provided we can reach agreement with relevant native title claimant groups it may be possible to develop on stock routes. We would note though that our developments are not necessarily huge in terms of impact e.g. one well in a stock route will take up only a fairly small area.

State forests are also subject to native title in most cases, or they may be earmarked for conversion to National Parks so we may or may not be able to develop in them.

There is not one rule for us and one for you. The government plays an even hand in trying to manage the interests of both the community and business.

11. In a 100% cropping area, how can we not be worse off with wells and gravel roads through our cultivation land? We have spent hundreds of thousands of dollars on machinery.

That's a challenge that we have. We have set up the intensive farming committee and we have twelve landholders as members who grow cotton and other crops. We are trying to work together to see how that can be done.

We 100% acknowledge that there will be some impacts. A couple of per cent of your land would need to be taken up by infrastructure, tracks etc, and we would have to compensate for loss of land use.

12. It's not just compensation, gravel roads are impossible for us to farm around.

We understand the particular issues around cropping land, with laser levelling, overland flows and so on. We are trying to find a way to make our developments work in those areas, and we don't underestimate the challenge. We are still working on ways that might work, so can't give specific answers just yet. We will work with the Intensively Farmed Land Committee to check whether any solutions are viable.

13. The property next to me has wells and it is 100% cultivated land.

14. The EIS is pathetically weak and no one does checks and balances. Invertebrates aren't included and since the clearing of land for mining in this country, 200 flora and 23 fauna species have been endangered. Will mining companies take note of our fauna and flora?

Invertebrates are definitely part of the EIS process. We will be looking at ecosystem types, habitats and different species. In terms of other mining companies it is difficult for us to comment. Our activities are tightly controlled under the *Nature Conservation Act* and we are required to have offset agreements on impacted land at fewer than one for one.

15. That's not true as was proved with QGC with three endangered species. Mining companies don't respect the EIS. We need more checks and balances. Australia has the highest rate of extinction in the world. Mining companies need to take note of flora and fauna, especially with regard to road kill.

We can't comment on other companies but Arrow is committed to the issues you raised. We are happy to add you to our consultation process and can give you access to the technical studies.

16. Can anyone explain Section 804 of the *Petroleum and Gas Act*?

We will take that on notice.

Section 804 (Duty to avoid interference in carrying out authorised activities) of the Petroleum and Gas (Production and Safety) Act 2004 stipulates that a petroleum authority cannot interfere with another person undertaking lawful activities. It states:

a person who carries out an authorised activity for a petroleum authority must carry out the activity in a way that does not unreasonably interfere with anyone else carrying out a lawful activity.

Maximum penalty 500 penalty units.

17. Have you ever thought of using a silicon lining inside the drill casings to prevent gas leaks when the ground moves? It's used overseas.

We are always looking at new technology and are open to ideas from relevant applications overseas. We will investigate this further.

18. I'm talking about the upside of the casing where there is ground movement.

We are confident that with correct construction our wells can withstand the normal range of ground movement due to saturation and drying or swelling of soils etc.

19. You need to research better on coal gasification, some of the facts you said aren't true.

20. You said a wellhead safety program has been initiated by government. Can you give me the number of wells that have leaks around them?

We have had three leaks. The leaks occurred above ground, and caused only very minor gas leaks that we have since repaired

21. From your knowledge, there are no leaking wells now?

No, we have had three leaking wells. Our position is that since the above ground section of wells is constructed of items that need maintenance and replacement from time to time, then there is a chance that they will leak. That is why we inspect our wells on a regular basis, and 'work them over' to replace the moving parts that operate below ground.

We have not had any leaks evident from sources below ground. We cannot speak for other companies.

Dalby

Date:	24 November 2010	
Venue:	Showground Pavilion	
Facilitator:	Jan Taylor, Principal	JTA Australia
Presenters:	Al Mueller, Vice-President Operating Services	Arrow Energy
	Tony Knight, Vice-President Exploration	Arrow Energy
	Darren Stevenson, Asset General Manager South	Arrow Energy
	Carolyn Collins, Environment Manager	Arrow Energy
Other speakers:	Andrew Faulkner, CEO	Arrow Energy

- 1. We live 12 km west of Dalby and have 12 wells on our property which aren't hooked up yet. We had three gas leaks but didn't know we had them as you can't smell the gas. You must tell people that you can't smell it. The direction came from Brisbane not to tell the landholder. Everyone in this room needs a licence and you won't answer the government's question about the registered waste water. You say you are changing your spots, why not be honest?**

Yes we did have some leaks; these occurred above ground and were fixed very easily. We accepted the feedback and developed a program of awareness for gas safety which we are rolling out for all landholders before gas is produced.

- 2. You won't answer the government's question. You have registered waste and a petroleum lease over our property; there is no requirement for Arrow to take that waste and there are no coordinated arrangements between leases. People need to be aware you are doing this and getting away with it. There are different leases and pipes going through it which is illegal.**

The water produced from coal seams is considered a registered waste, even though it is a natural product that has been produced from many water bores for years. The law around CSG water and its handling, transportation and disposal is changing, and more regulation is being put in place. In the instance you refer to we erred in regard to a legal technicality, whereby we believed that we could transfer water between two adjoining tenements without the need for a coordination arrangement. This was shown not to be the case; it was inadvertent, and we would argue was an understandably easy problem to create.

- 3. What about PL194, you don't own that?**

All water at Kogan (PL194) goes to Wilke Creek mine. Under 'beneficial use' approval arrangements with government and coal companies, the water is used for coal washing and the government allows for a change from CSG to mining use.

- 4. Will that water ever be used for irrigation?**

The current plan is not to do so.

- 5. The Water Group Advice on EPBC (Environment Protection and Biodiversity Conservation) Act Referrals states that the management and sustainability of the Great Artesian Basin is a serious concern. The best case scenario for total water extraction is 307,000 megalitres or approximately 45,000GL (gigalitres) which is more than predicted by the proponents.**

- 6. Both the proponents (QGC and Santos-Petronas) intend to lower groundwater pressure in the Walloon Coal Measures by at least 400 metres over most of the area to approximately 30-35m above the top coal seam in the Walloon Coal Measures. I am concerned how confident you are about the amount of water involved. Can you please address concerns about subsidence and other issues and government approvals of your industry?**

The EIS process is the mechanism we use for the government to judge us, to gather and analyse information that will then be used to assess the project, and ultimately determine if it should proceed, or else be modified to proceed on certain conditions.

We are still in the investigation phase, and well behind QGC and Santos in terms of project approval. We are currently studying aquifers, and carrying out groundwater monitoring to see how the aquifers will behave.

Our preferred approach is to put in place systems that maintain the regional 'water balance' whereby water we extract is returned to the environment, whether at surface or below ground, so that overall there is no net loss of water. There may be short term impacts on some aquifers, but we would hope that in overall terms we can maintain the balance.

The government is putting in place better systems and regulations all the time. Its knowledge is growing, just like ours, and by being the last proponent then we will likely wear the highest level of regulation and control.

- 7. I'm worried about the devaluation of properties on your map of the development area. If you are in the orange area shown are you going to talk to the individual landholders regarding wells and infrastructure on their property?**

We are definitely interested in, and committed to, talking to those landholders. We are talking to both landholders and financial institutions about the impacts. We haven't had an assessment yet of potential land devaluation and have seen some strong sale prices in the Bowen Basin. Some people there have been selling their properties and advertising them with gas wells because it enhances their income stream.

- 8. Can you tell me this method of CSG extraction is safe? *This question was addressed to the CEO of Arrow***

Safety is an Arrow priority. Our intent is that the processes for CSG extraction meet all property safety requirements; it is our objective and priority.

- 9. QGC's environmental application stipulated 100m x 100m for drilling and, if fracking, a further hectare of land. Do you envisage you require a similar amount of land?**

No, we don't frac. We have already trimmed the well footprint to 70m x 70m at the time of drilling and the well closure is around 8m x 12m when we've finished drilling the well.

- 10. Will you give a written guarantee that you will not frac?**

Yes. Note too that a commitment not to frac in the Surat Gas Project area has previously been publicised.

- 11. Have the properties in the orange area on your map seen how BP handled things in the Gulf of Mexico, Shell in Africa. We also know the impacts in China and PNG and a lady from India was saying how the industry was affecting that country. You say safety is your main priority, whose integrity is it, yours or do other people check? How does your company really provide a guarantee that the work is done with integrity when you know that contractors will do whatever to get the job done? Who monitors them?**

There is independent checking with integrity safeguards when the wells are drilled. Gas wells are an absolutely fundamental part of our business so if the cement is not installed

correctly and the well leaks then it's a waste of money. We take a strong interest in managing the drilling and well construction process, and careful management of our drilling contractors is a crucial part of the business. It is fundamental e.g. pre-drilling and pre-cement job meetings are held before a well is drilled, cased and cemented. Once a well is drilled our crews check them on a regular basis.

(From Andrew Faulkner (CEO) How do you get confidence we operate safely? I've spent four to five years in Nigeria and have twenty-eight years experience in the oil and gas industry and my first role at Arrow was to strengthen the health, safety and environment standards with corporate safety strategy and procedures, independent checks, audit plans, audit competence and better management of contractors.

12. How will you power the wells...from the electricity grid?

We use either of two methods. One is a gas-fuelled generator which sits on a pad next to the well site, and runs on the gas produced from the well. The other method is to bring electricity to the well by overhead lines. The benefit of the electric drive is that it is quiet, whereas the generator does not have powerlines.

13. Does the Queensland Government do any onsite auditing of the well drilling process?

The government has the right to conduct audits. Today the government established a new department which includes an enforcement unit with conditions they are required to work to (see extract from DERM website below)

**14. Minister for Natural Resources, Mines and Energy and Minister for Trade
The Honourable Stephen Robertson**

Groundwater resources protected by new CSG laws

25 November 2010

New legislation passed in State Parliament tonight strengthens the protection of Queensland's water bores and natural springs near coal seam gas projects, Natural Resources, Mines and Energy Minister Stephen Robertson said.

The new provisions, contained in the Water and Other Legislation Amendment Bill 2010, will sustainably manage the impacts of groundwater extraction, the Minister said.

'The amendments deliver on our Blueprint for Queensland's Liquefied Natural Gas Industry, and are part of our commitments to protect groundwater resources,' Mr Robertson said.

'These amendments assist in achieving a balance between the development of the coal seam gas industry and environmental sustainability.'

Mr Robertson said the Bill amends the Water Act 2000 to require resource companies to ensure that landholders in the vicinity of any extraction operation continue to have access to a reasonable supply of water.

'These companies are required to mitigate or manage the predicted impacts on both existing and new water supply bores as a result of groundwater extraction by entering into 'make good' agreements with bore owners prior to these impacts occurring,' Mr Robertson said.

'The amendments also provide a dispute resolution process and establish offences for petroleum tenure holders who fail to comply with their obligations.'

Mr Robertson said the changes introduced a strong groundwater management regime to manage any possible impacts on water supply bores and natural spring ecosystems from the extraction of underground water by gas companies.

'These companies are now required to produce an underground water impact report at least every three years, which will be subject to public consultation,' he said.

Mr Robertson said the amendments give a new role to the Queensland Water Commission, as an independent management body, to oversee the monitoring, regional modelling and reporting of impacts on underground water for a declared cumulative management area.

The Bill also includes amendments to the Water Supply (Safety and Reliability) Act 2008 to ensure recycled water from the coal seam gas process is subject to the stringent requirements of Queensland's recycled water legislation.

'Companies involved in CSG extraction are now required to develop an approved recycled water management plan if they propose to release water into a watercourse, aquifer or town drinking water supply,' Mr Robertson said.

Other conditions imposed on the companies include internal and third party audits of their recycling operations and a requirement to make water quality information publicly available.

The introduction of the new laws today follows the announcement yesterday by the Premier Anna Bligh of a 36-strong new LNG Enforcement Unit based in local communities as an integrated one stop monitoring and enforcement service.

The Premier also announced \$3.5 million in funding over the next three years to AgForce to help landholders effectively negotiate with the CSG industry.

Other Government initiatives to monitor possible affects on water from the CSG industry include:

.A \$5 million Healthy Headwaters program to assess the opportunities and risks associated with using CSG water.

.The independent QWC is developing a regional groundwater model for the Surat Basin

.A new land access framework which outlines rules and compensation guidelines for negotiations between resource companies and landowners.

15. When you carry out the bore monitoring, does that include the many unregistered but legal bores?

Yes, there are thousands of wells and we are required to look at them all.

16. You say you are not allowed to frac as part of the EA so do you anticipate that well spacings will be closer and if so at what distance?

It's not a matter of not being allowed to frac, the geology just makes it unnecessary. We only frac if we have to, where the permeability is low and it is difficult to extract the gas.

Well spacings depend on the permeability. At the shallow points the wells are further apart at 800-1200m. As the permeability decreases, the well spacings decrease.

17. Therefore it's somewhere between 800-1200m?

Yes, that's what we are working on at the moment.

18. The state government has not legislated a minimum distance from homesteads?

We have put in place a minimum distance of 200m but that's under consideration because of a whole lot of factors. It depends on the conditions, hours of work etc. When the wells are near houses in the Bowen Basin we use barriers such as sugar cane; there is no light or noise and the impact of the drilling process is minimised.

19. Closer than 200m?

No.

20. You mention making good and trigger thresholds for areas of domestic use and irrigation but how do you differentiate your impacts from other sources?

We are investigating through third parties such as hydrogeologists who are monitoring groundwater flows. This will help us understand. 'Make good' is not just at trigger levels but a warning bell that the whole objective is to keep water in the Basin to minimise impacts. So far we haven't had any impacts on the bores.

21. Dumping water into watercourses in an emergency...what constitutes an emergency and is it raw or treated?

An emergency would be a major flood event where our dams were either filled by rainfall, or else over-run by floodwaters. We plan for a certain contingency level on our dam design and operation, to allow for the seasonal ups and downs that occur.

22. The state government talks about billions of dollars, how much is going back into the community and not-for-profit organisations?

Yes the consolidated revenue goes to government and it doesn't go back to the community in a transparent way. We can't ask government to return those royalties but Arrow has its own social investment program. What Arrow will commit to the community is being considered through the EIS process i.e. the social impacts, roads, transport studies etc and how we will mitigate those impacts. Arrow directly contributes money to the Western Downs Regional Council for the upkeep and maintenance of the roads.

23. Most of the wells are on crappy clay soils and the concrete will deteriorate rapidly. The salt water will also have an impact, what sort of steel do you use? You say the wells will last 20-30 years but how can you do that without cracking or leaking?

We use robust fit-for-purpose products and carry out well-integrity checks, and check for corrosion. If the well loses integrity and it's a significant concern we would decommission the well.

24. Comment: with regard to the Great Artesian Basin and making good *Humpty Dumpty sat on the wall, Humpty Dumpty had a great fall, all the King's horses and all the King's men couldn't put Humpty together again!***25. The make good arrangements for the 2000 bores in the coal Walloons, I assume the modelling will indicate the impacts. What process is there for Arrow to ensure that landholders have a future water supply?**

When we take water from the Walloon Coal Measures there will be impacts, that is clear. We are working on the process to ensure landholders have a future water supply. Obviously this is a complex matter, and needs to look at the existing state of aquifers, the overall demand on them, the rate of water production etc. We will present the 'make good' process at a future consultation session.

26. The Huttons (Hutton Sandstone aquifer) sit below the Walloons, and we have a major problem if the Walloons are drained. The government may need to change the legislation to access that aquifer. If there is no other aquifer in the area would

pumping water from elsewhere be possible as a long term strategy to remedy the problem?

Yes. Aquifers will recover in time, so we just need to find a solution that works until the natural state is restored. We can look to things like pumping water from elsewhere, or else replacing allocations with treated water, or producing water from different horizons and so on. We are confident that long term solutions will be found, and we are working on them now.

27. I understand that there will be significant access required for your staff to our property. I have five children so what screening process do you have in relation to child safety?

That's a good question and I don't have the answer. We will get back to you on that.

The issue of requiring staff and contractors to qualify for blue cards is being investigated.

28. Most farmers are interested in compensation. The concern of many is just related to roads and access etc. In contrast, the wind farming industry made friends with the farmers so why can't companies like Arrow act more generously to farmers with compensation. That would be a benefit to your industry? Question directed to the CEO

The fundamental principle behind our compensation is to make good for our impacts. Your idea is to be more profitable, but the challenge will be to make an economical project.

29. Comment: I can't see how Arrow will have any liability if the water becomes a resource.

30. The map indicates the tenure goes over the town of Dalby, how close is it to the town and have you consulted with the local council?

Yes we have, we learned six months ago the practical edge of the development. The town is removed from the project area in the EIS so it has been removed from our application for a Petroleum Licence.

(Dalby ends)

Cecil Plains

Date:	24 November 2010	
Venue:	Cecil Plains Hall	
Facilitator:	Jan Taylor, Principal	JTA Australia
Presenters:	Al Mueller, Vice- President Operating Services	Arrow Energy
	Tony Knight, Vice-President Exploration	Arrow Energy
	Darren Stevenson, Asset General Manager South	Arrow Energy
	Carolyn Collins, Environment Manager	Arrow Energy
Other speakers:		Arrow Energy

- 1. Can you please provide an explanation of the drilling process and the integrity of holes? The Hillier Report states that there is interconnectivity in the Walloon Coal Measures. If there is interconnectivity it won't matter how good the integrity of the holes are as it will still connect?**

We stand by the safeguards included in the design and construction of our wells. The casing and cementing procedures have been developed and tested around the world for decades so we can be sure that the design is correct. Also, we monitor the well during its life, and will be able to determine if the well integrity is lost, and be able to simply plug and abandon the well to prevent any problems.

The real issue here is the potential for connectivity which is something that can occur on a broader scale due to the difference in pressure between formations and aquifers. It is an area we are still studying to understand the nature of the shallow and deep aquifers and the nature or potential of any natural faults and pathways that might exist between aquifers. We also need to understand the timeframes over which these things happen. Part of the work we are doing in our exploration and EIS programs is to gather and analyse information that will help us better understand this issue. We don't deny the potential, but believe that with good science and knowledge impacts can either be avoided or managed so as to maintain the productive value of the land.

- 2. If you are confident about your construction technologies and you use words like integrity, would your company provide a written guarantee to landholders that they won't suffer any losses?**

We can guarantee that if our wells are found to be causing or contributing to losses of water, causing adverse impact on landholders, then we would either stop or modify the activity. The challenge will be to distinguish between the normal or current state of aquifers versus the impacts caused by our activities. For example, in long periods of drought it is logical that recharge of shallow aquifers will be slowed or stopped.

Our guarantee will be broad, and reflect our awareness of the duty imposed on us as part of our licence to operate. If we are causing significant environmental harm that in turn impacts upon the livelihoods of members of the local community; we must take action to address the problem.

- 3. So you stand by your point that if there is potential interconnectivity or loss it will be as a result of water loss from other avenues?**

For clarity, we say that our wells will not allow direct connectivity between shallow (e.g. Condamine) and deep (e.g. Walloon Coal Measure) aquifers. The potential mechanism to drive connectivity could be creation of a pressure difference between aquifers by the

withdrawal of water from the coal measures. We don't understand the hydrogeology of how that system works yet, and we need to get more information so that we can understand it.

4. In terms of baseline monitoring, will every well be monitored in the tenement?

In time we would like to get basic information from every water bore across our tenements in terms of things like depth, pumping rates, bore design, water quality etc. Given that there are so many bores we will establish a priority to do this, since the timeframes for our development are very long, and it will be many years before we develop into more distant portions of the tenements.

In terms of active monitoring, we will focus on those bores within a radius around our development areas. If we detected movement attributable to our activities, we could then extend the monitoring even further afield. We would use a representative selection of bores for this purpose.

5. So part of the baseline data won't include existing water levels? With pre-existing wells used for agriculture the landholders would have to get an independent person to take these measurements? The landholder wouldn't have a basis to argue if they didn't have this information.

We will test bores within a reasonable proximity to our development areas, and then monitor enough bores so that we can pick up, over a wide area, any potential impact created by our activities. There is no need to test every well immediately, since some areas will be well away from development areas for many years.

We could also discuss any specific requests to test bores and baseline water levels as part of our land access and compensation negotiation process. Furthermore, the results of our monitoring program design and implementation plan may end up calling for testing over wider areas than we had anticipated, and if that was the case then we would certainly broaden our baseline data-gathering program accordingly.

6. I would like to observe that Arrow has made a significant change in its use of language around water and the project's potential effects. Today you have spoken of the Walloon Coal Measures as part of the Great Artesian Basin. To carry on from the previous question, is Arrow looking for areas with natural connectivity between different groundwater aquifers? What will Arrow do if areas of natural connectivity are confirmed?

The Surat Basin is part of the Great Artesian Basin. We are certainly looking at the potential for interconnectivity, and part of that work is to understand how the different stratigraphic elements of the Basin behave. For example, the movement of water through the Walloon Coal Measures will be quite different to movement of water in the known sandstone aquifers such as the Springbok and Precipice. We are certainly looking to understand the hydrogeology of the entire region, with particular focus on things like potential connectivity.

In terms of what we will do about connectivity, the steps are to explore the area to understand the geology and stratigraphy, the second is to put in place a good monitoring system that can detect changes over time (since these things don't happen overnight, so we need to watch them constantly over time). Finally, if connectivity is confirmed, and Arrow's activities were causing a detrimental effect, then we would look at our options and if necessary stop the activity.

Our concern is that monitoring has to be done over a long period of time to detect groundwater changes, and by then you'll have already had the impact. That is why we believe in a moratorium on coal seam gas activities.

A moratorium is not the answer. There are two key issues that we need to consider here. The first is the need for good science based on real information and monitoring, plus good

design and operational practices. We need to be able to keep doing work, including exploration and trials of different development methods, to get that information.

The second is to look at mitigation measures. Our aim is to maintain the water balance in the region. If we can effectively substitute water by re-introducing it back into the sub-surface or surface environment, then the overall impact can be mitigated. There is clearly no way we can say that we will not affect water levels in an aquifer such as a coal seam, since we must reduce the water level in order to release the gas. However, while we may impact one area at some point, our aim would be to ensure that on a gross scale we maintain the overall integrity and balance of the groundwater systems that exist in the Surat and Condamine aquifers.

- 7. The horizontal transfer of water in the Walloon Coal Measures is very slow, and the Arrow petroleum acreage is very large, so you will have screwed up the whole area before an impact is seen. It is inappropriate and insensitive of Arrow to refer to the area 'west of the river (Condamine)'. Your maps show broad scale industrialisation of the area within the next 10-15 years. As part of the EA the original application showed ATP683 as having only 30 homes.**
- 8. As part of the submission on the original application people indicated the maps were inaccurate, and miscalculated the number of homes in the ATP. The holder of the EA resubmitted those applications to show the number of homesteads as 500-640 sensitive receptors (i.e. homes, businesses, grandkids' play areas) which was 2000% more than listed in the series of maps in application one. Disclaimer reads Please verify the accuracy of this information which is copyright of Arrow Energy Limited.**
- 9. The area east i.e. Horrane Trough Lot 334030 is a sensitive receptor and has not been recorded on the amended map. How can we as a community trust your company?**
While Arrow's acreage is very large, we only develop certain portions at any one time, and the timeframes over which we extend our fields is very long, measured in decades. There will be time to see the impacts from one area and to take corrective action, or else to stop an activity, long before it affected the whole area of our tenement holdings.

We refer to the area 'west of the Condamine' river only in the context of discussing the very important shallow aquifer that is the Condamine Alluvium. It is not to say that we somehow treat this area differently in terms of our interaction with landholders, or concern for relevant environmental matters. It is merely a geographic division.

On the matter of what the government calls 'sensitive receptors', but which in reality refer to local residences, we don't take this issue lightly. The information in the EA application was produced from existing DERM maps and information. Clearly this information was in error, but to put this issue in context, we are still at the exploration stage of our investigations in the ATP683 area. This involves fairly limited works over wide areas, and we need to go through a lot of processes before we start developing any fields on a commercial scale. We also ground truth areas before we start works, and can make sure that any activities are not located too close to residences. An administrative error is not cause for loss of faith in our ability to do works on the ground with due regard to the community.

- 10. The idea that the Australian CSG industry is subject to strict environmental impacts, including water, is a nonsense.**
- 11. The community is relying on authorised officers who do not ground truth. Billions of dollars worth of projects are based on maps that are very inaccurate. People who review those maps have stated they don't come out here. You think our homes are**

changing in five years' time? We don't care whether you produced the map, or if the Cecil Plain's kindergarten produced the map, but we dislike the fact that you come out here without ground truthing your maps. We don't give a monkey's about amendments to legislation because all the government is doing is facilitating your industry.

12. Some people have children who will be inheriting their farms in 50 years. Who is responsible for any problems that arise from your activities down the track after you have gone?

The accuracy of maps used during an administrative process is not an indictment on the overall level of regulation across the CSG industry. The EA sets in places conditions that we must adhere to, and that the government audits. It is essentially a set of rules that we must follow and apply to wherever we go. The EA is just the first step in the process that then lets us come and ground truth an area.

In terms of who is liable for problems that arise, the answer is quite simply that we are. The liability remains with us even after we have completed the activities and surrendered the tenements. The government also keeps very substantial securities during the term of our tenure, and we must demonstrate that we have not breached our operating conditions in order to have the security refunded.

13. What you (i.e all Arrow people) need to realise is that you have nothing this community requires. You offer no value to my business but grief and if you want community acceptance, you can't win it by doing things like producing that inaccurate map of ATP 683, for instance. You must bring something of value to us, add value to us as a community including landholders and businesses. Until you do, you will meet resistance among landholders.

We understand your statement. It is a difficult situation; a classic clash between geography and geology. You are farming above the surface and there is gas below the surface. You have great farming land, and there is also a worldwide demand for energy. However, we want to have good relationships with the communities in which we operate; we most assuredly want to look after the people who are here. There won't be a gas business if we don't take that approach.

14. In the first presentation you talked about the Land Court and that you have no cases in the Land Court therefore you are managing compensation properly. I would like to see that Arrow will publicly remove itself from the Land Court.

As you know the CEO has already responded. We don't want to go to Land Court but there are cases where it may happen. Just as in a marriage, you don't want it to happen but it can.

15. Do you stand by your comment that you will not use law enforcement to gain access to farms?

Arrow will not use force to enter properties. We will not use police or any type of enforcement to get onto land. That is not the way Arrow does things. We want to maintain a good relationship with the landholder and the community, and we know we must get that right. There is energy at stake but business is secondary to getting it right for the community.

16. You talk about your long experience with coal seam gas; presumably you mean through experience gained at other companies. Most people here talk about the experience (on the land) that they gained from their grandparents. ATP 683 is approximately 1,700 square kilometres. Do you know the market value of that agricultural land?

No, we haven't done the sums. It does cover a large area, some intensively farmed land and mixed farming land.

- 17. I imagine it is close to \$1 billion. If we experience a loss of value of 30%, that is equivalent to \$300 million. How much did you have to pay Anna Bligh for the rights to the tenure?**

We pay an annual rental for the ATP. The payments are calculated according to the number of blocks in the ATP; it is about \$1,000 per block per year so it is not comparable to the numbers you are talking about.

- 18. Arrow sold to a Chinese and Dutch company and we have invested close to a billion dollars in our agriculture. We want a level footing. If it is stuffed up it will be for the benefit of a foreign company, you haven't done anything for us. You haven't put a lot in but turned it into a big capital gain. Without you, our industry could go on forever.**

- 19. You speak of the relationships you want to build with us. We don't want to build a relationship with you. We don't want you on our land, we can't co-exist with you. We have long established farming systems (on intensively farmed agricultural land). There is extensive knowledge of land management on black soil among our community. If you listened to us, you would understand our activities and yours cannot co-exist. We can tell you that now. Is there any possible situation where you could reach a decision that your project on intensively farmed agricultural land is not feasible?**

We have no intention between now and 2023 to develop on intensively farmed agricultural land. In the meantime, we have the opportunity to work with you to understand if it can be done. We realise that is a very large challenge. At this point in time we are not prepared to say it can't be done.

- 20. Your presentation showed the differences between coal seam gas and underground coal gasification industries but failed to talk about one large similarity. That similarity negates your efforts to distance yourself from underground coal gasification as you both have the same government regulator. The same people watching Kingaroy are watching you guys. There has already been coal seam gas-related industrial accidents and other stuff ups within the industry and concern about interconnectivity and fracking. The government clearly can't regulate a chook raffle. You mention the Queensland Water Commission. The Commission is trying to retrain people who are used to reading water meters. In relation to your comments on the movie *GasLand*, I will also make a comment on that. You all have the same parent companies, technologies, and issues of access therefore you can't distance yourself from the US experience. You only have 2000 wells now and industrial screw ups have already happened. Seven to eight multinational companies are basically behind all the coal seam gas and liquefied natural gas projects in Queensland. How can we as a community have any faith that we have a strict regulatory authority?**

We can't answer that question on behalf of the government. We are bound by regulations and controls, but it is true that unless the government has in place the right checks and measures, there are questions. The industry has moved ahead quickly and the government is trying to keep up. There is work going on as we speak; only today the government announced funding for a new team of enforcement inspectors for coal seam gas. They are putting a stronger regime in place now.

- 21. With respect, the government also announced today a budget of \$5.4 million to sort out the pay debacle for nursing and they are not expecting an outcome for two years. We don't have any faith. If you want to develop in highly sensitive areas, you will need to change tack with the government. You will need to seek changes in legislation to allow you on our land. With the exception of engineering, your company is not being proactive. You talk about pilot studies but there is nothing proactive in that area.**

- 22. I commiserate with the black soil farmers. I hold the view that unfortunately no matter how much anguish they go through, the state government will determine what happens. If the project proceeds, Arrow may have construction camps to the northwest of Cecil Plains, and those camps will house many people. Down the track, there may be 40-50 people based permanently in the area. What guarantee do we have that some of those people will reside here and help the Cecil Plains community?**

There are people associated with the industry who work in the region now. Dalby is a good example of how workforce housing works for Arrow. We do encourage our staff to live locally, we appreciate that this has housing and employment market implications. We like to recruit locally because people from the area have local values. Some of our employees own farms locally, e.g. at Jimbour Plains, and they understand and care about community issues.

- 23. I mean local, I mean Cecil Plains, not Jimbour or Dalby.**

We are using Dalby as an example. We would look to do that in all of the townships where we operate.

- 24. Contractors as well as your staff work on land they don't own. Who carries the public risk related to Arrow staff or contractors operating on private land?**

The petroleum activities conducted by Arrow as a right of our tenure are Arrow's full and sole concern and responsibility. That responsibility includes contractors, and basically anyone who does any form of work for us. There is no linkage to the owner or holder of private property. If there is a legal dispute between Arrow and a contractor, liability does not lead back to the landholder.

- 25. This acceptance of responsibility is limited to petroleum activities, and obviously we are all bound by the same civil and criminal laws relating to other matters.**

- 26. Arrow proposes to conduct operations on the western side of the Condamine River. Where will the water and salt go?**

We are doing various studies and preparing plans to manage the water and salt. Our basic aim is to maintain the water balance in the region, and to ensure that any salt is disposed of in an environmentally appropriate way, or else put to beneficial use.

- 27. Will you do that before the wells go in?**

Yes

- 28. With regard to the Land Court and compulsory access, I have asked this question of Michael Roche (Chief Executive, Queensland Resources Council) previously. What makes Arrow think the coal seam gas industry is so important in the state that its powers should exceed those of any other business? Many industries have a requirement to access land, including my business. However, I do not have the right to compulsorily enter land. What makes you so important that you can come onto my land without checks and balances, at whatever rate, for whatever period? We find that offensive. You would relinquish that right if you were genuine in your attempt to engage landholders. Relinquishing that right would immediately take the heat out of the situation, particularly on ATP 683 which is over the floodplain and where the value of business and land is so much greater.**

The Land Court process has been laid out and matters can be taken before it. Arrow does not want to go down that path. However, we are not going to relinquish that right. We want to work with the community. I can't say we would never use that right in certain circumstances, but that is not what we want. It is in no one's interest to end up in court.

We don't think our rights exceed those of others. We negotiate terms and compensation for our activities. Those negotiations are commercially based. Ownership of the gas resources belongs to the state government, and it reserves the right to allow extraction of that gas.

Obviously it (and Arrow) is aware that in order to do that we need to access private property, but we don't over-ride the rights of landholders in order to do so.

The right to minerals and petroleum, being reserved to the Crown, is not ours to relinquish. If Arrow wasn't here, another company could come in and try again, and again, since while there is gas here that people want, there will always be people trying to get it out.

We understand the unique features of the floodplain land, and the correspondingly higher value of that land. We are trying to find ways to work together, so that our businesses can co-exist. When we seek to enter your land, we are not trying to offend anyone, but simply to conduct our business. We are happy to talk commercial terms.

29. At the last meeting in Cecil Plains (June 2010), an Arrow representative said that if you had 95% objection to petroleum activities on the intensively farmed agricultural areas, you would not pursue your operations there. It is pretty clear from this meeting that you have more than 95% objection?

That still stands and is consistent with what was said. We are not so insensitive as to think we could force our way onto land with that level of community opposition. We are working on how activities on intensively farmed agricultural land can be done, in order to change the perception that farming and coal seam gas activities cannot co-exist.

30. Every farmer in this room is prepared to lock the gate on you. There is nothing new that has come from this meeting tonight.

31. Out towards Roma, it is impossible to get motel rooms and the condition of roads is disgusting. Do you contribute to new roads and social infrastructure?

Arrow makes direct contributions to the Western Downs Regional Council on a project basis. That way we can be sure that our contributions are going to specific roads that are affected by our operations.

32. What about accommodation?

Chinchilla is an example of a town that has constructed four new motels and we have company people stay there.

33. I went to a sale in Blackall and couldn't get accommodation anywhere.

As part of the social impact assessment for the EIS, we have to assess the impact we will have on temporary accommodation such as motels and hotels.

34. Shouldn't the study be done before you get there?

Initially the bulk of our workers will be accommodated in construction camps. This will transition to local housing as we shift from construction to operational activities.

35. We have some of the best farming country in Australia if not the world. You bastards want to take the risk of coming here and stuffing it up. Stuff ups are already happening all around the world even though those projects are 'regulated' by government too.

36. I sympathise with other community members who can't get motel accommodation. This is a major issue. Recently I tried to get accommodation in Roma when I travelled to Charters Towers and couldn't, then Injune, and had to travel all the way to Emerald where I went to 12 hotels before I finally found a room! I was a mess by then. I am concerned that CSG development will have a negative economic effect on Cecil Plains. You need to make commitments regarding equipment sourcing, catering, etc. Going back to the previous question about devaluation of land, one of your former land access officers went to great lengths to say how much money Petrochina and

Shell have and the possibility of 30% (\$300 million) depreciation was discussed. My question to Arrow is whether the company is prepared to evenly divide \$300 million in a bond over every square metre of ATP 683 and lodge that with landholders' bankers as an equity bond?

That was a comment Robbert made about Shell and PetroChina having a lot of financial strength, and their ability to take responsibility in case something goes wrong. Putting the government aside for a second, when Arrow goes to make its financial investment decision on the project, we have to assure ourselves that the project can be done without significant adverse impacts e.g. drawdown of groundwater. We have a lot of work to undertake before we can make that investment decision. If this project were to have a significant adverse impact it is not good for the community or Shell and PetroChina.

In terms of an equity bond, there is no need for a site-specific bond. We already are bound to lodge environmental securities with the government, and even if they are exhausted we are still liable for damages. Shell and PetroChina can't just pack up and run away if someone goes wrong. They have to face up to, and sort out, problems.

37. The current bond you have with the state government wouldn't be enough to cover screw ups on two farms, let alone across the whole ATP.

Regardless of the bond lodged with government, Arrow would be liable should any damage occur from its activities.

38. Impacts of the project are already here. You have affected us already and it will only get worse. You don't bring anything to the table except when you are forced to by an upset community. We only get snippets of improvement in legislation. Who is looking after rural Queensland? We are already affected and you want us to take more risk. These are the issues that Arrow has to understand before we unlock the gate. The land access meeting in Dalby (run by the Queensland Government) was a public debacle and disgrace. Now, the game has changed.

I have the dubious luxury of living in the middle of the QGC development and this is my fifth session in the last three days. A young man who lived near me is now dead from a traffic accident on a deteriorated road. We hear they will fix those roads but the reality is it doesn't happen despite being told it will. Arrow is better than QGC but it hasn't walked the walk yet.

We have seen fracing where it shouldn't be at the moment. We dragged the vice president of QGC around our farms recently and showed him a problem of water running from well pits across the paddocks. His response was that it might not be a QGC well, but we were in the middle of its tenement. Eventually he admitted it was a QGC well. It's good to see that you're alert, awake, watching. We have watched rents go up and people move away. My message to the community is that you really have to be on your guard.

I am going to talk as a mother who lives in this community. These projects are having an impact on our mental health, and what we are going through will only get worse. Every time I sit down to have a cup of tea with my husband, guess what we are talking about? CSG! Then the phone rings and it's a neighbour. Guess what we are talking about? When we go down the street and see other people we know, guess what we are talking about? Please think about the personal impact you are having. I have four children. My eldest is studying agriculture at Gatton. Is he a fool? The farm is the children's future, but right now it is their playground. I don't know where all the Arrow people here tonight live. Can you imagine, on a relative scale, having a gas well by your clothesline?

I attended the Dalby session earlier today. The information given at Dalby was that you don't have your final plan. Compensation is not an issue because we are shutting the gate and it won't get to compensation. The interpretation was that Arrow was interested in making money for Arrow and not providing it to the landholders. People need to know whether they will be compensated. Is it going to be adequate? Is it going to be a business proposition? Compensation should be a healthy business decision for landholders; it should be financially profitable. You can't compensate for ruining an aquifer. There's no financial gain for us. I realise this is negotiated one-on-one with landholders, however I want Arrow to take home the message loud and clear: we don't have confidence in the state government or Arrow Energy or DERM. We will end up with land problems, dust, salt, water, noise problems.

Arrow's CEO Andrew Faulkner spoke at Dalby. Andrew discussed how Arrow compensates for impact and how it can add a level of value to landholders beyond that. We have heard many things tonight that we have taken onboard. We will digest these things inside Arrow and will respond in future consultation.

39. You need to lobby government to change the policy and legislation if you want to be on our side. You have all the power, all the rights and we have nothing.

We hear what you say about government.

40. Are you happy with the legislation?

We have a commitment to good relations and good business. What you are saying in relation to compensation is an aspect of that. We have to look at that.

41. You provide compensation for future activities but what about current activities. You won't provide a bond to the same capital value. In the period between now and when you want to operate on black soil, there will be people who want to sell their land.

Who do I ring to negotiate with, because there is a reduction (in value) in the market?
Arrow can only respond to impacts on property value that can be verified. We can't respond to a perception of loss of value as a result of Arrow's activities in the region. We hear the message but we are not seeing the proof at the moment.

42. I raised questions at the government meeting in Dalby that the government couldn't respond to. Would new legislation force gas companies to compensate for loss of capital value and artificially raised costs of doing business? In other words, the people who wrote the legislation don't know the answer. If I were a gas company, I wouldn't stick my neck out beyond the requirements of the legislation. It doesn't cut it to say you can only have the discussion about impacts (decreased property values/ impacts to groundwater) when proof presents. There is proof now. We have heard nothing new from Arrow tonight.

I can't give you an answer tonight.

43. Did Darren say something wrong, that you would compensate for loss of capital value?

44. We asked these questions in June, where are your answers?

45. About land value, the powerpoint said the changing value or use of land will be compensated for. Did that mean nothing?

Change of value will be looked at as part of the compensation we offer.

46. You stated you are looking into a number of issues with regard to conducting activities on black soil and even suggested a period of up to 10 to 15 years before you would do any activities on that type of land. That's 10 to 15 years of uncertainty. What

do we do with our businesses in the meantime? Arrow will damage soils and we lack faith that you can rehabilitate. What process do you have to rehabilitate black soil?

Examining the issue of operating on black soil is part of the work that will be done by the Arrow Intensive Farming Land Committee. We will look at all activities from exploration through to construction, operation and decommissioning.

47. We have a wealth of community knowledge about how to work on black soil that collectively exceeds 15 years. With that combined community knowledge, I don't think any farmer would consider it possible to conduct petroleum activities on black soil. Why don't you leave us alone and accept our knowledge about the land?

Arrow will take that as a comment.

48. I don't think you understand the damage you did in this hall tonight when you said you won't seek to operate on intensively farmed agricultural land until 2023. You have condemned the community to uncertainty. You are effectively the market. You have affected every decision people here make related to using their land. You are not getting the point; I know you are engaging us through various committees. Our family has raised questions you can't answer. Some of us are simply saying we won't discuss land access until you start answering questions.

49. For many people in this community, their farm is their superannuation. What happens if they want to sell out in one year, or five years, or ten years... and can't find a buyer because there is uncertainty whether coal seam gas will happen on their property? What do you say to those people?

When I said that we wouldn't seek to develop on intensively farmed agricultural land until around 2023 I didn't mean to imply that our investigations wouldn't be finished by that time. We expect to know the answers to the questions we are working through (how to manage petroleum activities on intensively farmed agricultural land) before that time.

50. What about those who can't realise their super funds?

51. Can you please supply us with the twelve ingredients in your drilling muds?

Yes, we can supply that.

These will be posted on the Arrow website, together with details of our drilling fluid management processes.

52. If I proceed with independent bore analyses, can I send Arrow the bill? I have no other reason to do an investigation that could cost thousands of dollars, except for Arrow coming onto my land.

Like any business we can only pay for works that we agree to beforehand. We have explained that we are developing a program of bore investigation and monitoring. Once that plan identifies when and where we should test bores that may be affected, then we can talk about testing. To do anything before then is not necessary from our perspective.

There is also an issue of timing here. At the moment we are working in other areas of the Basin and not affecting your water bores. It will be more appropriate to discuss this with you once there are firm plans for production. When we know the potential area of groundwater influence (determined by modelling our field plan), it is more appropriate to discuss it with you and we can target particular bores for investigations.

53. Will you foot the bill down the track, whenever it is?

We will deal with it on a case by case basis, in each area. If it is necessary that testing is done in order to better understand the hydrogeology, or to obtain baseline data, and it forms part of our plan, then yes we would pay.

54. When the draft EIS comes out in 2012 and the Terms of Reference, can we have a copy?

Yes, the Terms of Reference will be available on our website.

55. Prior to 2023 can Arrow provide us with more detailed maps of your future plans, particularly in ATP 683 and more specifically the Horrane Trough maps. The maps you have are still vague, we are not idiots. Other companies are presenting more detailed information and we need more science.

We are still doing that work and we are happy to put a package of information together when we have those plans. We agree that we have presented a broad brush of information. The discussion is now reaching the point where we can bring in more technical detail. However, Arrow is behind the other coal seam gas companies in terms of its project design. Arrow will be undertaking its detailed planning over the course of the next 18 months. We will continue to give as much information as possible when we can.

56. I am a farmer. I love being a farmer. I would like to ask on a personal note if all the Arrow people here love their job? If they don't, then all you are doing is screwing people for money.

This was a farmers' refusal meeting tonight so best you leave town. One benefit of the project is that we might get some decent police in town!

Millmerran

Date:	25 November 2010	
Venue:	Millmerran Community & Cultural Centre	
Facilitator:	Jan Taylor, Principal	JTA Australia
Presenters:	Tony Knight, Vice-President Exploration	Arrow Energy
	Darren Stevenson, Asset General Manager South	Arrow Energy
	Carolyn Collins, Environment Manager	Arrow Energy
Other speakers:		Arrow Energy

1. If you are in the back paddock and it's a fizzer, do we have access to the drilling log if we want to drill a bore on the property?

Yes. For every well that we drill, we must submit a report to government which details all of the information about the well and what we found. This information is publicly available on the DEEDI website.

2. Do you test the water as you drill through it?

Yes. If we strike water we will test the volume by flowing it for a short period as part of the drilling process. We use compressed air to lift the water to surface, and by doing this for a while can get a reasonable idea of the volume and rate of water that can be produced from an aquifer.

3. The issue of compensation agreements seems open and is a difficult issue to resolve. For a landholder, it will be difficult for him to know what inconvenience you will create on his land in the future. Is it standard for each individual? How do you build this into the agreement?

There are standard compensation and access agreements, which make it easier for all involved by knowing that there are common terms. The actual amount of compensation will vary depending on a number of things, like the activity we are conducting, the time we are on your land, the type of land and its use and so on. We have developed a standard way and rates to calculate compensation.

As a guide, the compensation we pay is less for an exploration well than for a production well, since an exploration well is short term.

4. If I have a bore operating at the moment at 40 or 50 feet, it has been operating that way for many years, and then it drops, do you automatically get the blame for that? Who do we contact about that?

CSG companies do not automatically get the blame; there is a process of investigation to determine if CSG activities were responsible for the drop in pressure. To explain, our tenements cover a very large area although at the moment we are only working in a fairly small portion of that area. So if a bore well away from our fields is affected, then it is clear that it is unlikely to be due to our activities. We are happy to check, and certainly if a bore is in proximity to our fields or wells, and is affected, we will certainly take action.

5. Who do you contact?

There are three avenues in which to lodge your concern: Arrow directly, DERM, freecall 1300 130 372, and the Queensland Water Commission. Your concern will ultimately be directed to Arrow for investigation so we are quite happy if you contact us in the first instance.

- 6. Earlier you spoke about the differences between CSG and underground coal gasification. However, with CSG you have to bring the water up to the surface which poses large risks. Underground coal gasification leaves water underground which is not much different to open cut mining. Is that a fair comparison?**

It sounds reasonable. We are confident that the water we pump out for CSG operations is quite safe; people in the Surat Basin have been using water from bores in the Walloon Coal Measures for 100 years or so. With regard to underground coal gasification, we do not wish to comment extensively on another industry but as we understand it there are two problems with UCG, one is the trouble they have with the mixture of gases created by the combustion process, and being able to maintain a consistent quality of product, and the second is that a by product of the combustion process can leave chemical residues which can include benzene and toluene (BTEX group chemicals) etc like Kingaroy.

By way of analogy, some people may have heard of 'town gas' which was commonly used in many cities 50 years or more ago, before widespread use of oil and gas. This gas was derived by a process somewhat similar to UCG, although the conversion process occurred above ground rather than below. In Brisbane, at the site of an old town gas site at Teneriffe, there has been a long legal battle between developers and contractors regarding the clean up of the chemical residues that were produced from this process. As we said, UCG uses a somewhat similar process, burning the coal *in situ* in the ground, but possibly leaving behind coal tar which could eventually pose a problem.

- 7. How does underground coal gasification differ from depositing ash from coal fired power stations underground? Power station ash also contains nasty things like silicon.**

In underground coal gasification the residues and combustion products such as ash are left underground. By comparison, in an above ground power station, the ash accumulates in the boilers and must be removed and disposed of by some means. I am not sure what the ash contains, but clearly the thought of spreading it around the surface is not appealing, which may actually favour UCG.

- 8. Has it only been mandatory to cap them in the last twenty years?**

Yes

9.

This question refers to water bores in the Great Artesian Basin, which have been the focus of a program of capping and piping of bores in order to save and make use of the water, rather than waste it.

- 10. Can you clarify that you are taking the same water farmers have used for the past century?**

Yes. There are 700 or so registered water bores licensed to take water from the Walloon Water Measures which is exactly the same formation that we target for gas extraction. People have been using CSG water for many years.

- 11. So they have a certain amount of gas coming up with their water?**

Yes they can do. If anyone drills a bore into a coal seam, and then pumps water from that bore, there is a good chance that they will see gas eventually. At very shallow depths the gas in the coal is already gone, but if you drill down below about 100m (300ft) or so, then you are likely to find gas as well as water.

- 12. I am curious about the difference between exploration and production wells. How many exploration wells has Arrow drilled? If exploration wells produce gas, what's happening to the gas? What happens with regard to the well lining? Are they sealed to the same standard as production wells? How are they rehabilitated?**

All wells are sealed the same way; cemented from bottom to the top with cement slurry.

Exploration wells don't produce gas, they are for sampling coal and have a short life. Once we have the sample, they are sealed and decommissioned, which means filling them with cement.

Production wells are the same concept but their life is much longer...up to fifteen years or more. Following exploration, we drill pilot or appraisal wells in a cluster of five to test gas production. The gas can't be put into the pipeline so we flare the gas that is produced by pilot wells and the government regulates the period of time for which we are allowed to flare the gas.

Wells are rehabilitated in a process we call 'plug and abandonment'. This involves removing all equipment such as pumps from the well, filling it with cement, then cutting off casing below ground, and finally covering the well with topsoil so that it is not evident at surface.

- 13. With regard to land access, AgForce and the Queensland Farmers Federation (QFF) have been talking to the Queensland Government for a couple of years and in the last few months the government has changed the laws. Compensation has changed with land access agreements. Landholders have twenty days to talk to the company, then another twenty days for mediation, then another ten days to go to the Land Court but the Land Court has a six month backlog. At the end of fifty days, the company can come on and drill. We've actually got no further, and AgForce pulled out of the working group.**

We work with government as part of the Land Access Working Group. We want to achieve a fair and reasonable outcome. When there are many different parties, it can take time to resolve. Our fundamental belief is that we must have a good relationship with private property owners. If we come on to the property after 50 days and simply say let's go to court, then that's not a good basis for a relationship. During our presentation, we showed the figure of 130 land access agreements that we have in place, with a further 40 under negotiation, and zero in the Land Court. The Land Court can be damaging and time consuming and not good business. For Arrow, it is absolutely the last resort.

- 14. All the gas companies (four) are drilling into the Walloon Coal Measures; I think 2,000 Arrow wells, 6,000 BG, Origin, I'm not sure and 4,000-5,000 for Santos further to the west. When you take that much water from the Walloon Coal Measures, which is just below the Condamine alluvium, what happens then? No one seems to know how the interconnectivity works. The water moves so slowly, in 100 years time the pressure in the Condamine alluvium could be significantly reduced.**

In answer to the question about the connectivity between the Condamine Alluvium and Walloon Coal Measures, this is a very critical part of our investigations at the moment. It may be the case that this can occur, and we certainly need to understand both the mechanism and the timeframe over which these changes and impacts will occur. That is why we are exploring the area, to obtain more information about the nature of the formations and the potential for connectivity, as well as putting in place monitoring programs to check whether there are real impacts.

Our overall approach to water management in the Surat Basin is to maintain the 'water balance'. This is to say that while we may impact one area for a short time we balance that impact by introducing water elsewhere so that on a gross scale we don't remove water from the system. This may include things like us using the water we treat to supply users of surface water or shallow aquifers (such as the Condamine) so that they in turn reduce their pressure on those sources. Likewise, we can seek to return water directly back to Surat Basin aquifers by injection.

15. In the presentation you spoke about the film *GasLand*. Did you say there was no coal seam gas in the US?

No, there is. The CBM industry, as the coal seam gas industry there is known, is very large, and certainly uses fracking. However, the shale gas industry there is very large, and possibly exceeding the CBM industry in terms of size and area impact, and it is the subject of much attention in the movie.

16. Hundreds of thousands, it's not all shale? A bloke from QGC told me that there were lots of problems with the coal seam gas industry in the US as well as oil shale.

You're right. There is a large coal bed methane or coal seam gas industry in the US, and also more recently shale gas in New York and Pennsylvania. In recent years, there has been a huge upsurge in drilling and fracking in those shales which is what *GasLand* talks about. *GasLand* is not directly relevant to Queensland. We have strict government regulations and safeguards, different geology and techniques used, and products containing the controversial BTEX chemicals are banned in Queensland.

17. The methane you are taking out of holes, if production is good enough will you liquefy and export it?

Yes, there will be an LNG plant in Gladstone and the gas will be pumped from the Surat and Bowen Basins to Gladstone.

18. If you had three adjoining properties and good production, would you build a plant there?

No, the LNG plant in Gladstone is a big deal and costs billions of dollars. We would not have local plants in the Surat to make LNG.

19. You will therefore pipe the gas to Gladstone, send it in a gaseous form to be liquefied?

Yes, we will compress it and pipe it.

20. You have to extract a lot of gas and also provide power to your gas facilities. Why can't we install a gas turbine and feed the town with cheap electricity?

Part of the field development plan is power generation.

Australia already has cheap electricity since most of it is sourced from coal-fired power stations. However, with the uncertainty about carbon taxes, no one is investing in new power stations, even though demand for power is growing. The problem for gas fired electricity generation is that gas-fired power stations must compete in the electricity pool that operates on the east coast. Gas-fired power is more expensive than coal, in the absence of a carbon price, so as it stands the local market for electricity is very low value, and not an economically viable proposition for companies like Arrow to continue to expand into. We certainly remain committed to the Australian market, and already supply a lot of gas to power Queensland's energy needs, but until the price improves then it is just not viable to invest in it further.

21. What do you think will be the impact on the local and rural workforce when Arrow rolls out its project?

We use Arrow's Dalby operations as a case study for that issue. When we initially undertake exploration we have small crews of six to twelve people who typically stay in motels or drilling camps. As we move into construction and operations, we set up a base in town. We will not have fly-in, fly-out operations, but source employees locally. A benefit for us is that by hiring people with local values, they appreciate landholder issues and have respect for their land. It can also help stem the migration of young people away from smaller towns like Millmerran. We acknowledge that this has impacts on other local businesses.

22. History has seen a lot of poaching of workers by the CSG industry that exacerbates employment shortages in other industries.

There is no simple answer to that issue. It is human nature to pursue jobs that pay the most money so that people can look after their family so in a way it is a social issue. We would hope that by bringing prosperity and development to the regions that we make them more attractive places to live, which can then in turn attract different sorts of people who may prefer to work in rural and local industries.

One benefit of developments like ours is that it provides opportunities for young people to stay in the local area. We often hear stories of how young people must leave rural areas as there are few jobs, and at least we are bringing jobs back to the region.

Goondiwindi

Date:	26 November 2010	
Venue:	Goondiwindi-Waggamba Community Cultural Centre	
Facilitator:	Jan Taylor, Principal	JTA Australia
Presenters:	Darren Stevenson, Asset General Manager South	Arrow Energy
	Carolyn Collins, Environment Manager	Arrow Energy
Other speakers:	Nigel Koolik	Arrow Energy
	Jonny Shirley	Arrow Energy

1. We have heard that 2-4% of farmland will be impacted. Can you please give an indication in terms of salt, heavy metals and topsoil?

Some 2-4% of the area of land will be disturbed during the production process i.e. the building of pipelines, clearing of the 70m by 70m area to create the site for drilling (although this reduces to 10m by 10m once the drilling phase is finished). The ground above a pipeline then goes back to almost virgin condition and the amount of permanent impact is quite small.

With regard to salt and contaminants the water doesn't touch the ground until it enters the ponds. The water is piped to aggregation dams through gathering lines as raw unprocessed water then it travels to treatment plants and is discharged as 80-90% clear water. The 10-20% brine stream is stored in high integrity, double lined, lead detection ponds. We are converting all our ponds to this standard. The brine will be transported to approved land fill, or else crystallised for commercial use.

With regard to topsoil disturbance, the standard operating procedure is to cut the topsoil, reserve it and put the subsoil back into the hole and then respread the topsoil. This is a routine requirement now for most resource industry activities.

2. This is at the pipeline development stage but what about the pilot stage?

In the pilot stage there are five wells and we build a lined dam and the production water goes from the pilot wells into the dam. When enough gas is produced, which could be from a few months to a couple of years to get the data, the well might go to a production well or if not it is plugged (i.e. filled with cement) and abandoned (i.e. casing cut off below ground level and the site rehabilitated).

3. When going onto properties to do test holes is the access situation working better with these landholders e.g. not using five gates etc?

We like to work with landholders to figure out the best way to access a property. This may mean taking a certain route, or avoiding certain areas etc. We are used to doing this, and as long as the requests are reasonable then we are happy to comply.

4. People are very worried about access.

We understand the change in operating environment that comes with allowing people onto your property. This goes against the norm for most landholders, and we put a lot of effort into making sure our people do the right thing. For example, we have in place Land Access Rules that set out clear boundaries of behaviour that we will not tolerate. We have sacked people and contractors for doing the wrong thing on people's property.

5. A lot of landholders would like you to enter perhaps through the rear of the property and install new gates instead of going through their paddocks and opening five gates.

That is fine with us. We can discuss this sort of thing with the landholder, and we accept that we may need to put in place special measures to minimise our impact.

6. What is the situation with easements near homesteads in the Wandoan area, it affects the value of properties and rent decreases. Can you move the alignment?

At Wandoan the easement is for a high pressure pipeline and therefore we can't move it too far. However, we pick a path beforehand that minimises constraints. It has to go somewhere, and we do try to select the route that avoids creating the biggest impact on landholders. With low pressure gathering pipelines we are very flexible.

7. The core holes north of Goondiwindi, how far away from the town are they and have you got consent from the landholders?

The holes are very widespread, and we drill about one exploration well every 200 sq. km to start with. We are working to get the consent of landholders, and obviously won't start drilling until we have that. We expect to start work there in 2011.

8. With regard to the exploration maps, we requested these previously and gave our names and information for the maps (No. 11) but we never received them and to my knowledge no one has those maps?

We will sort that out. The maps won't have the actual well sites on them. We don't usually send maps because the locations haven't been finalised and we haven't confirmed them with the landholders.

9. Most of us know where the points are, we've never received lot and portion number maps?

We'll send them to you. Please call the freecall number 1800 038 856 or email suratgas@arrowenergy.com.au if you need any maps or information.

10. With regard to land access agreements, the landholders have been addressed but local government has been neglected in the process. We have a program for grading roads to someone's place and it is pointless us coming back later after land access has happened. We need to know months in advance for road maintenance.

We are in the process of improving our standard notification process for moving big gear or rigs around. It is regulated under the Gas Act to notify Council with ten days notice. In Dalby we sit down on a regular basis for discussions.

We are planning to meet with Toowoomba Regional Council in the near future to discuss roads with them too.

11. Two weeks is the problem, we need more notice. We look like idiots when we grade a road and you come along for access. There is no compensation for that.

It is obviously hard for us to know what has happened in an area before we arrive. We would like to think that people can contact us and tell us these things, and to give us the chance to fix them at the time.

12. Does Arrow intend to base anyone in Goondiwindi?

It is too early to say really. We are still exploring the area, and while our drilling crews will stay here, we just don't know if there will be anything more substantial in the area until we finish our exploration works.

13. How soon will the council know that?

We want to improve our communication with all local government authorities in areas where we work. Part of that communication would be on things like roads, and the other on things like our longer term development plans.

14. Are you intending to use council landfills for your salt disposal?

We are aware there are no landfills here and we prefer not to use landfills at all. We would like to have a commercial option, or else creation of dedicated landfill sites suitable to accept salt.

15. You said you were working with Dalby Council but the roads off the Moonie Highway around Kogan haven't seen a grader on them for some time. What's the situation about keeping those roads in order?

There are regular talks with Western Downs Regional Council to determine what needs to happen to keep the roads in a safe condition. We are conscious that we do affect the roads and that we need to talk with Council, and fix what we damage. Western Downs Council recently graded some roads and we contributed to the cost. We've also provided maps to council of our main traffic routes, and if the project goes ahead we will have to factor in road maintenance as part of managing our impacts. In terms of the Moonie Highway, this is also partly QGC 's territory, so it will also be required to work with council.

16. You said 80-90% of treated/clean water goes into storage. How is it treated?

At the first stage of treatment it is reverse osmosis to basically separate the salt from the water. We also look at the sodium absorption ratio, and other chemical properties of the water to make sure it is suitable for use. Water in the environment naturally contains some chemicals, so we just need to make sure that the water we treat ends up about the same.

17. This is on site, the production site?

Yes. We currently have two reverse osmosis plants in the field working at the moment, at our central gas and water processing facilities. The water is treated before being released for beneficial use.

Water travels through the gathering systems to the aggregation dams and at that stage reverse osmosis is performed. It goes through a membrane prior to that.

18. Does reverse osmosis remove heavy metals other than salt?

The water produced from the reverse osmosis process is extremely clean. The water is not showing a great presence of heavy metals, with iron being the main chemical we find.

19. With the dam upgrades for saline concentrate, what preparation is done? You say double lined but what do you do to rehabilitate it first as brine is already there?

Because water is already in the dams at the moment we will build new dams and take the existing water from the existing dams via the reverse osmosis process and then add it to the new dam. We are planning rehabilitation of our first significant dam now. We have spent a large amount of money on studies to determine salt penetration, we've looked at the soil and how to treat that soil and how best to rehabilitate it.

20. With regard to monitoring water quality, how often is it done, where is it done and is the information publicly available?

It depends on the particular activity. We monitor where we are currently working at the moment. The frequency varies and the data is not publicly available at the moment but will be in the future. The information is provided to QWC and is on its website. Groundwater information is available as well as the amounts of water.

21. Are you independently checked?

Yes, there are site visits by DERM which takes its own water samples and concentrations in dams etc.

22. You have impacts on local communities e.g. rent and severe impacts on the cost of living.

Part of the EIS is looking at those issues through the social impact studies. We will have an investment program and mitigation measures. The program will look at those things down the track.

We try to use local people so that we bring benefit to local communities. If our workers are local they have local values and understand how things work. When you use fly-in fly-out workers they don't have the same understanding. However, there is no escaping that we do have an impact on local labour available, although that is also a sign of progress and opportunity for people.

We know too that we can have an impact on housing prices. Dalby prices have increased as well as the rents, but ultimately this is the sign of a healthy and vibrant town. Money brings new business and opportunities to towns.

Arrow employs about 100 people in Dalby, and when fully developed it will be approximately 200 at the operational phase. We do use camps during peak construction phases, when it is simply not practical or possible to accommodate a large workforce in town.

23. You employ locally?

It is certainly our preference to do so as much as possible.

24. Would you be conversing with our Chamber of Commerce? We don't want some businesses squeezed out.

We will and do engage with local government and other agencies. We want to see economic development and prosperity in town, and we need local businesses for all sorts of things, so we don't want to lose them.

25. There are three other gas companies in Dalby, if each is hiring 100 multiplied by four that's 400 and their respective families, that's 2,000 people, it does have a huge impact, a cumulative impact.

We are responsible for looking at cumulative impacts of all the social studies and groundwater. All the gas companies need to study cumulative impacts.

26. Arrow is using local government roads in Cecil Plains, some of which are gravel/forestry roads and those roads cannot handle the traffic. I don't know if you are contributing to the Toowoomba Regional Council because you didn't answer the question very well. The council needs years of notice.

When the project goes ahead we will put money into those roads, it's about two to five years ahead and probably five years behind the level of work being carried out closer to Dalby. Jonny [Arrow staff member] meets regularly with Western Downs and Toowoomba Regional Councils. We are not contributing to Toowoomba Regional Council at the moment.

27. You are using Toowoomba Regional Council roads now.

We meet Toowoomba Regional Council every two months and will meet our obligations in the future. At the moment our activities in the Toowoomba area are very limited and sporadic. However, despite that, we will work with it to make sure that we pay our share.

28. We've lived in several places with mining in Tara and Chinchilla and the traffic associated with mines is very dangerous. There are accommodation impacts, motels etc and it's happening in Chinchilla now. You will affect the tourism in the area.

Traffic safety is our number one recognised risk. We are trying to work out what to do. We recognise those risks and we have adjusted working hours to before peak hour and later in the afternoon to avoid peak hour traffic.

29. With this development there is uncertainty and risk for local communities, how can we benefit from what's happening? You have to select and train staff and we have the Goondiwindi Technical and Training College, do you use local facilities?

In Dalby we have twelve trainees in high school and Arrow has a relationship with TAFE. There is course work and field work and they leave school with Certificate 2 which is formally recognised and will help with the drain on human resources and help prevent kids from leaving town. Arrow sponsors mechanics and other business apprenticeships.

30. With regard to the Broadwater scheme, how far away are you from utilising water on the lateral and pivots? Have the studies and tests shown the performance out of those, is it promising and if so how far away?

We haven't done those studies yet. We are doing field work for Broadwater before we put in an application. Daandine is complete and under investigation by the state government but the rules for the use of beneficial water have changed. Blackwater, Grassdale and Glenelg are six months plus away. Fresh water is not available yet.

31. Today's *Courier Mail* said CSG could have a potential impact on local aquifers, surface water and springs. How does it affect your company and how do you alleviate concerns?

We recognise that concerns about water, both groundwater and the water we pump from coal seams, is of major concern to the community. We are trialling various methods to deal with the water, and our aim is to maintain the overall balance of water in a region. By balance, we mean the gross amount above and below ground in a region. Our trials include substitution of water supplies, where we pump water to irrigators' dams so they don't have to draw down groundwater supplies, as well as re-injection trials, where we seek to put the water back into underground aquifers.

32. You are putting wells down before you monitor therefore the damage could be done?

You must have the wells before you can monitor. There is current information available and we are adding to that. The well integrity is very good and we are confident about the way we do our wells.

33. With the water bore monitoring, is there a trigger for government? 80%?

Triggers are set but they are not related to the volume of flow but to levels, five metres for consolidated aquifers and two metres for unconsolidated and springs. Impact reports and cumulative impact reports from government will monitor that.

34. Isn't the government protecting all valuable farming land? Won't that affect you?

Government is working on the Strategic Cropping Land policy to protect valuable cropping farming areas. We support that approach, and believe that our activities can be done in a way that preserves and maintains SCL for the future.

35. Potentially it can?

Yes, it most certainly could, depending on the types of constraints that were placed on us.

36. Is the minimum depth of a pipe 700mm? 700mm is not enough.

The depth depends on the land use. With grazing land the depth is 750mm and roadways 1200mm, and could be deeper if required. We are required to do a risk assessment with landholders based on how you use your lands.

37. What is the minimum distance the wells will be from houses and dams? 250m for wells is way too close for a residence, especially with kids.

250m is our minimum standard based on environmental impacts. We modify security of a well to account for activities on the land. If you are concerned about your kids we have to protect the well. We erect high security mesh fencing around wells in public areas. We

carried out a risk assessment about six months ago when we were concerned about vandalism. We can use a range of different measures.

38. What is the average size of dams?

The dam size is site specific. The northern dams are smaller than the Surat Basin. At Tipton the brine dam is around 1000 megalitres, the aggregation dam and treated water dam around 400 megalitres each, transfer dam 400 megalitres, therefore between 400-1000 megalitres depending on the site.

39. That's a hell of a lot more work for council for town planning, with minimum distance from town for gas wells, gathering pipes, dams etc.

True, our tenure covers towns like Dalby and Chinchilla but Arrow has met with council and drawn a line around towns and the boundary has excluded towns and taken those areas out of the EIS.

40. What is the radius?

There is no simple answer since we need to work with council on its future development plans. In some instances there is no problem with putting infrastructure close to towns, whereas in others, perhaps due to noise or traffic etc, it is not appropriate. These sorts of things are normally considered in the EIS process.

41. What is the expected cost of water for irrigation, I heard it was \$16 per kilolitre?

We don't have a price for water, and even if we did it is not our expectation to make a profit from it.

42. If the core holes are successful in Goondiwindi which way would you take the gas and power?

It would travel north to Gladstone if successful.

43. Would you have a power station here?

Not sure about the power solution, whether we build a little power station or one big one with transmission lines or we take power from the grid and then the feeders will need upgrading.

We don't have a development plan yet; after that we will look at the power station, we are two years away from that.

44. Will there be further development of the Kogan Power Station over the next 24 months?

Not by us but potentially other companies. There are companies ahead of us who are producing more gas and will need to ramp up over time. They are using the power station as a place to consume gas to manage ramp up.

45. You said 100 people were employed in Dalby, how many live in Dalby?

About 80% of our staff who run the field live in Dalby. Obviously we have people who come and go, such as the exploration drilling crews.

46. With regard to loss of water in the wells, if you don't measure pressure, how do you know when you reach a two to five metre drop in aquifers?

It is part of the monitoring program. We have a number of monitoring bores at the moment which are separate to production wells. The information is available on the QWC website. We will soon be measuring adjacent aquifers and monitoring the drop over time. Modelling will tell us what the drop is likely to be and will indicate areas immediately affected and then we will intensify studies of landholder bores.

47. If you don't have wells parallel to the pilot wells upfront, by the time the wells drop it may be too late. Reinjection could be too late?

Monitoring wells goes in parallel to pilot and production wells but not before exploration wells. Wells are designed not to leak. We don't monitor wells at the time of exploration.

48. Bores go down to different levels across the district. How do you know you are monitoring the aquifer that is supplying the water?

That is part of the monitoring program. We are working with DERM to identify the areas that are affected. We have a program of 100 monitoring bores over the next 12 months. The government has not put in pressure thresholds; we will be measuring other things.

49. What about the pressure, if we don't have the right level we don't have the pressure.

50. Is there compensation?

Yes, we are liable beyond the life of the project. We are aware of the three major issues, we need to give people certainty, concerns about land access and compensation.

51. What is the benchmark for monitoring? I'm worried about water. We have flowing bores. We have tested dozens of bores in our area.

We have an obligation to use that information as our baseline.

52. I'd like to see landscape protection on your list of issues and very high on the list, e.g. soil conservation, weeds and feral weeds. Investigations have been carried out by government on natural resource management and we are pretty protective about our landscape. CSG is covered under other legislation and has different standards to some sections of the community.

Thanks for the feedback. Landscape, flora and fauna and all those issues are being studied as part of the EIS.

53. How many other gas projects are in our area? Do you liaise with them and how soon do they start?

This area forms part of the Surat Basin, and we know that the Surat Basin contains coal and gas. It is more a matter of when, not if, someone wants to come along and extract that gas to use as energy. We all use energy, and the world is hungry for it. We don't work with other companies, but undoubtedly one day one of them will want to do something in this area.

54. Of the water that is taken out of the ground, what is the annual volume that comes out of the Great Artesian Basin? How much is treated and re-used and what happens to the rest?

At the Daandine field there is enough gas to feed 50,000 homes and it produces 2ML/day of water to produce the gas. That reduces over time. It has a full water treatment facility but that water hasn't been used for irrigation yet. We are storing the water until we receive government approval. Currently we use the water for beneficial use for feedlots, cooling power stations and coal washing.

55. Is there any exit strategy for when production finishes in a region from a landscape and community sense? These types of industries come, use resources and leave and we are impoverished afterwards.

With regard to the landscape, we are obliged to clean it up and a bond is held with government.

From a social perspective we need to do planning. We have to look at the end of the life of the project, it's not like a power station with a few operational staff; infrastructure has to be built which is the most intensive part.

We are looking at a 20 year model and we try to have a consistent level of workforce to satisfy the workload.

- 56. Comment: It is not an attack on Arrow about council and CSG companies. Not all CSG companies contribute to roadworks but Arrow does. I am pointing out that the state government doesn't allocate royalties to local government and we need to get our fair share to contribute to local roads.**