

## Community Information Sessions 10-11 November 2010 Rockhampton and Blackwater

In November 2010 Arrow Energy continued its community information sessions to discuss coal seam gas (CSG) exploration in the Bowen, Styx and Capricorn Basins.

Questions and answers were captured by JTA Australia and are presented in this document. Questions varied across the session; to ensure that valuable information is shared throughout the communities. The notes are based on written records and include paraphrasing. In some cases, additional information is included to provide further context or explanation; this information is italicised.

The exploration information sessions were held in Rockhampton and Blackwater on 10 and 11 November 2010.

Arrow (including one of its predecessor companies CH4 Pty Ltd) has been active in the region for some time, with its first successful project the supply of gas from the Moranbah region to the Yabulu power station and some surrounding industries in Townsville; this commenced in 2005.

Arrow is now seeking to develop opportunities for supply of gas to new domestic and export markets, including a proposed LNG development at Curtis Island near Gladstone. As part of this work, Arrow will expand the scale and extent of exploration works throughout the northern Bowen Basin (between Glenden in the north, Blackwater in the south and east to Duaringa), as well as to the Styx and Capricorn Basins in the Marlborough-St Lawrence and Rockhampton areas.

This work is at an early stage; it will not commence at all sites immediately and will not occur in residential areas.

If you have any further questions or comments about the project or the meeting notes, please contact the project team:

**Freecall 1800 038 856**

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**Commonly used acronyms**

ATP	Authority to Prospect
BG	British Gas
BMA	BHP Billiton Mitsubishi Alliance
CSG	coal seam gas
DEEDI	Department of Employment, Economic Development and Innovation
DERM	Department of Environment and Resource Management
EDO	Environmental Defender's Office
EIS	Environmental Impact Statement
FID	Final investment decision
GAB	Great Artesian Basin
GLNG	Gladstone Liquefied Natural Gas Project (Santos/Petronas)
LNG	liquefied natural gas
PL	Petroleum Lease
QCLNG	Queensland Curtis Liquefied Natural Gas Project (Queensland Gas Company/British Gas)
QGC	Queensland Gas Company

**Queensland legislation pertaining to CSG:**

*Petroleum and Gas (Production and Safety) Act 2004*

*Mineral Resources Act 1989*

*Water Act 2000*

*Water Safety (Reliability and Supply) Act 2008*

**Maps**

Map 1: Styx/Capricorn Basin exploration index map

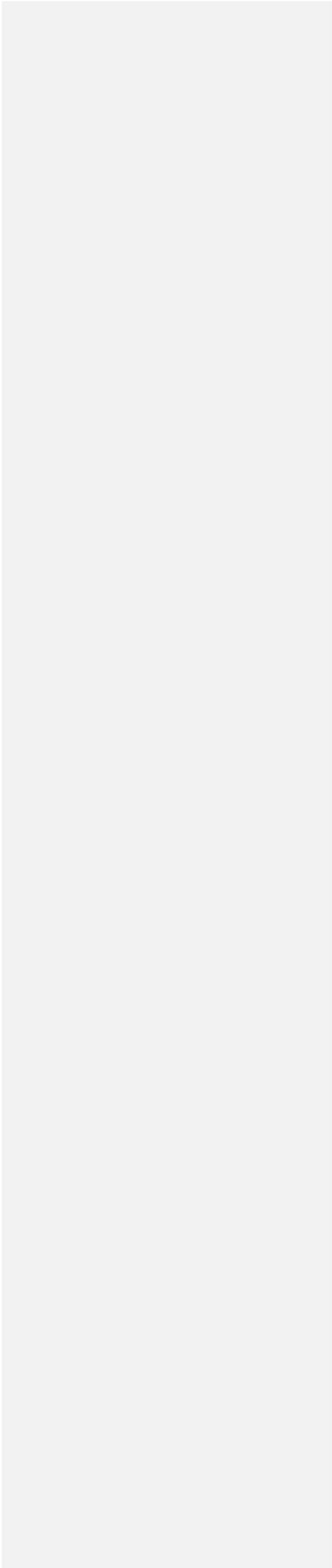
Map 2: Bowen Basin exploration index map

Map 3: Baralaba area\* exploration index map (\*located within the Bowen Basin)

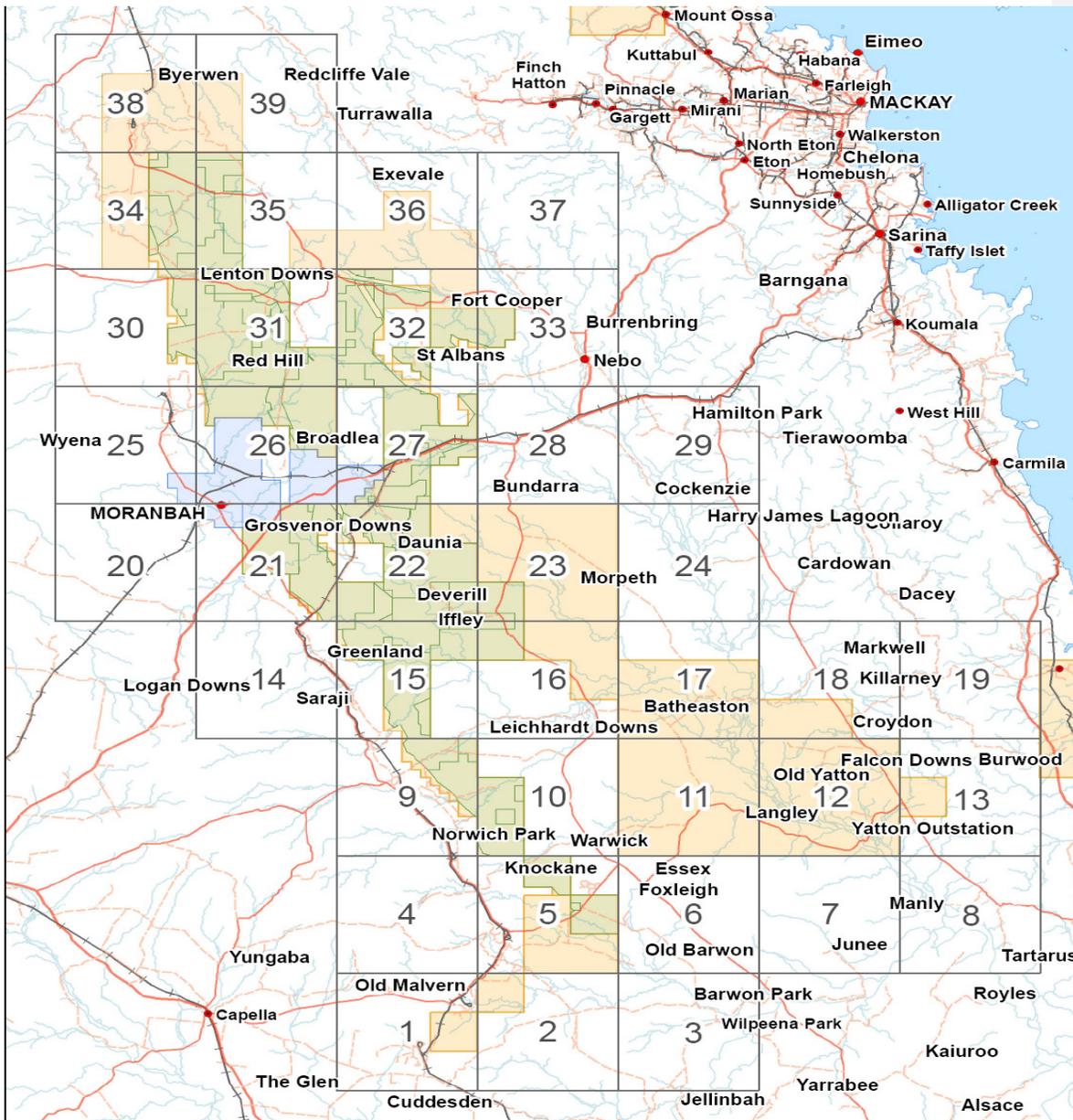
\*\*Please note that maps have been updated and may look different since the information sessions.

Should you require a more detailed map of your area, please contact **1800 038 856** to obtain these. The map index numbers will help give a guide to the corresponding map for your area.

**Map 1: Styx/Capricorn Basin exploration index map**



Map 2: Bowen Basin exploration index map



**Map 3: Baralaba area\* exploration index map (\*located within the Bowen Basin)**

**Details of community information sessions**

<b>Rockhampton community information session</b>		
Date:	Wednesday 10 November 2010	
Venue:	Rockonia Parish Hall (St Anthony's School) 390 Feez St, North Rockhampton	
Facilitator:	Jan Taylor, Principal	JTA Australia
Presenter:	Tony Knight, Vice President Exploration	Arrow Energy
Other speakers:	Leisa Elder, Vice President Community and Corporate Affairs	Arrow Energy
	Carolyn Collins, Environment Manager	Arrow Energy
	Julian Leonard, Land Manager	Arrow Energy
	Glenda Viner, Community Relations Manager	Arrow Energy

<b>Blackwater community information session</b>		
Date:	Thursday 11 November 2010	
Venue:	Lawrie Curry Auditorium, Blackwater Civic Centre, Blain Street, Blackwater	
Presenter:	Tony Knight, Vice President Exploration	Arrow Energy
Other speakers:	Leisa Elder, Vice President Community and Corporate Affairs	Arrow Energy
	Carolyn Collins, Environment Manager	Arrow Energy
	Julian Leonard, Land Manager	Arrow Energy
	Glenda Viner, Community Relations Manager	Arrow Energy
	Scott Sherriff, Manager Water Sustainability	Arrow Energy

## SUMMARISED QUESTIONS AND RESPONSES

### ROCKHAMPTON

#### 1. How does Arrow treat saline water?

The safe and environmentally appropriate treatment of saline water is one of our highest priorities. Our first preference is to seek to return the water to where it came from underground, so that we can maintain the water balance in the region. This includes looking at reinjection, or else substituting treated water for that normally taken under licence from aquifers. Our second preference is to find beneficial uses for the water, provided it meets relevant quality standards. In some areas we look to use untreated water for industrial use (e.g coal washing), or treated (that is desalinated) water for agricultural use. In the Surat we plan to trial for use on the land to demonstrate sustainability and ways to maintain water balance. All of these activities will require licences and approvals, and there are very strict monitoring and reporting requirements.

#### 2. What will Arrow do with the salt?

We recognize that the management of salt dissolved in coal seam gas water is of major importance and concern to the community, and we are committed to finding the most appropriate solution for the different areas in which we work. Our basic commitment is to gather and store the salt in safe and purpose built facilities that ensure it does not spread over the landscape, and then to either use or dispose of it in an environmentally safe manner. Our base case is to remove salt to a regulated disposal facility. However, our preference would be to use for beneficial means, such as in the chemical industry. Australia uses vast amounts of salt, so we will seek to find a best use for it.

#### 3. You are just one of many companies and the Queensland Government is only just learning; the regulation is quite inadequate. Are companies talking about using shared facilities to reduce the impact on the community, such as the plants on Curtis, dredging and the pipeline corridor? Is there any philosophy to minimize multiple impacts?

There is clear logic in consolidating infrastructure and so on, but these things are not simple and face numerous practical, commercial and regulatory hurdles. Equally, the demand for gas is growing so rapidly that whilst there may be logic in consolidating the downstream (i.e LNG plant) end, the upstream (i.e the gas fields) section cannot be consolidated, since we need to drain the gas from wherever it occurs over wide areas.

We don't think the consolidation story has ended yet, and companies will constantly seek opportunities as they arise. We clearly recognize the benefits of consolidation, although in many ways the pace is being set by the front runners - GLNG and QCLNG.

While we have said that consolidation is difficult in the upstream (gas field) end, and possible in the downstream (LNG Plant) end, the piece in the middle, the pipelines, are different. They are harder to share since they are designed to carry a certain volume of gas. Once the pipeline is at full capacity, it is physically unable to accept more gas. This can make it very difficult to share pipelines.

#### 4. What is the proposed timeline for the pipeline from Moranbah to Gladstone?

The Arrow Bowen Pipeline, which is what we call the Moranbah to Gladstone pipeline, is a major construction and investment activity. There are various steps we need to go through

before construction can start. The most critical deadlines will be submission and acceptance of our Environmental Impact Statement (EIS), which we plan to commence in late 2011; and our final investment decision for the entire project, which is planned for late 2012. Construction would follow the successful outcome of those two major approvals. We are currently refining and ground-truthing (i.e. physically checking) the proposed pipeline route.

We are currently also assessing our options regarding the originally proposed "Central Queensland Gas Pipeline" which was proposed by Enertrade many years ago.

**5. How long are you looking at taking gas for from the Surat, what is longevity of the project?**

Liquefied Natural Gas (LNG) contracts typically run for about 20 - 25 years, and many LNG plants around the world have been in operation for longer periods. There is certainly enough gas in Queensland to keep an LNG plant running for a long time.

*Further information: CSG is liquefied at minus 160°C to form LNG. It is 600 times smaller in its liquid state where it will be stored for shipment in LNG carriers for export to growing LNG markets.*

**6. Once the wells are commercially producing, is all the gas useable and sent to the pipeline or is some of it flared?**

Our absolute aim is to capture and make best use of every single molecule of gas we produce from our wells. Flaring is waste, and while it must be done in some cases for operational reasons, we seek to minimize the time and amount of gas that is flared.

During the last stage of our exploration testing, when we drill "pilot wells" which are remote and not connected to pipelines etc, we have no option but to flare the gas that is produced.

However, once we have achieved our goal of demonstrating gas production, we suspend these pilot wells until such that the gas can be piped to market.

**7. Is the pump station at the well site? Is the power for the sites brought in or generated at site?**

Each well has a small down-hole, submersible pump which removes the water from the coal seam and allows the gas to be released. These pumps can use either reticulated power from the power grid, or dedicated generators at the well (including some generators that run using some gas from the well itself). The water that is pumped from the well is piped to a central gathering point where we manage the water.

**8. Is there intention to convert Stanwell to gas? 28,000 tonne of coal is currently burned per day.**

Not that we are aware of. It is possible to convert power stations, as we saw with the Yabulu plant in Townsville, which used to run on kerosene, and was then converted to gas. I understand that Stanwell is coal fired, and couldn't comment on the technical issues of converting such a power station to gas.

Obviously gas fired power plants are cleaner burning and have less emissions than coal fired.

**9. Would you imagine a pipeline in our region? If not, how would you get the gas to Gladstone?**

In relation to the Capricorn Basin, no. The size of the Basin, and our preliminary understanding of the resource potential, suggest that it would not be big enough to justify the investment in a pipeline, which is very expensive. Also, given the topography of the region a large transport pipeline is unlikely.

It is more likely that we would look to something like local power generation. In that case we could have localised pipelines to transport the gas to the power plant.

**10. How noisy are your operations and how close to residences would wells be?**

The noisiest part of our operations is probably during the drilling phase, however, this is temporary. The rigs use diesel engines and compressors during drilling, and there is traffic from vehicles. Once the well is in the ground, the noise levels are generally very low, since most wells have electric drive units which are very quiet, and in any case the wells are always located away from residences.

If we need to compress the gas, the compressor station would also be located away from homes; and there is good technology available to reduce noise. Noise levels and mitigation methods are one of the impacts we consider as part of the EIS process.

**11. People in Gracemere have received correspondence about the pipeline. When are you going to discuss the details?**

The pipeline team will talk to individuals and the community. The original route is the Central Queensland Pipeline route, however, this has been amended. The final route depends on discussions with landholders and it is far from finalised at this stage.

We discuss with landholders how we operate and use the land and this will be happening in the next few months. Discussions have only just started since letters have gone out. It is certainly only a proposed pipeline route at this stage.

**12. What is the volume of water removed from each bore per day?**

We haven't done enough testing in the Capricorn Basin to know for sure, and it is certainly one of the things we look at when we explore. We can say that the amount of water a well will produce differs from basin to basin. For example, in the Surat Basin we pump around 1000 barrels of water per well per day, while in the Bowen Basin we pump only about one-tenth of that amount. (A barrel is approximately 160 litres). The amount of water depends on the geology of the area. We aren't sure what to expect here yet.

**13. Will you look at interconnectivity of aquifers before large scale drilling of wells?**

Yes. This is critical, not just for environmental reasons, but also for gas and water production reasons. The EIS process requires careful study of hydrogeology and will investigate issues such as potential interconnectivity of aquifers. Other work will also be done on groundwater modelling and monitoring to look at aquifers more generally.

Part of the work we will do is to establish a baseline understanding of the groundwater regime in any area we propose to develop. This would be complemented by establishment of an ongoing monitoring program in each area of operation, and include a focus on landholder bores. The issue of groundwater receives a lot of attention from Government, and there are many requirements imposed on us in this regard. For example, we are required to carry out baseline monitoring of all landholder bores before we start development.

**14. If there is interconnectivity, how will you fix this?**

It is a case of “prevention is better than cure”, whereby we would first seek to obtain a very good understanding of the groundwater regime, identify possible sources of risk that we might create, then designing our works accordingly. We believe that with application of good practice, particularly in our well design, construction and monitoring, we can maintain the integrity of aquifers to prevent leakage in the first place. We would complement this with a regime of monitoring to ensure early detection of any potential impacts, which would allow us time to decide the best method to respond to and mitigate the problem. Our reassurance to the community is that if we create and detect impacts on the groundwater system that could cause serious environmental harm, then we would stop the activity. We recognize our duties as a good corporate citizen.

We talk about monitoring and modeling a lot, as it is important since these mechanisms allow us to predict beforehand where we might have problems, and to put in place means to check for potential impacts, including cumulative impacts.

In relation to individual landowners and their waterbores, we would seek to enter into an agreement with them that, amongst other things, commits us to “make good” any impacts we cause. The agreement with landholders covers monitoring, thresholds and rectification options which may include:

- larger pumps
- deepening bores
- a new bore in a different aquifer (with approval)
- finding additional water supply
- providing other means of water
- or monetary compensation

**15. When will construction begin on the Surat pipeline?**

Construction on the Arrow Surat Pipeline (formerly the Surat Gladstone Pipeline) will begin once Arrow has all of the necessary environmental and Government approvals in place, and the Company has agreed to proceed with the investment required. The timing on that “Final Investment Decision” is currently scheduled for late 2012, with construction to start soon after that time.

**16. If I stand on the Emu Park beach I can see Gladstone’s lights now. What light impact will four plants operating at one time have? What will be the cumulative impacts on the harbour and seagrass?**

We don’t know at this point. It is these sorts of questions that the EIS will consider, and we must also assess cumulative impacts. Since we are the last amongst the four LNG projects proposed for Curtis Island, we will need to assess the cumulative impacts of all other projects. This is a significant piece of work to be carried out, and we will be reporting back to the community at times through the EIS process.

**17. Can all the companies get together with government and declare the rest of Curtis Island a national park?**

Obviously only the Government can declare an area as National Park. However, an “Environmental Management Precinct” will be declared, and all the four companies are

contributing to the maintenance and rehabilitation of the precinct. This includes provision for specific studies such as impacts on marine fauna like turtles. The Government will run and manage the precinct in effect like a national park. An announcement from the government about the precinct is expected in December.

*Details of the Environmental Management Precinct are available at*  
<http://www.dip.qld.gov.au/local-area-planning/environmental-management-precinct.html>

**18. What fauna studies and mitigation are being considered, such as for dugongs? What does it take to say you “won’t do”? What are the bottom line factors for land and social impacts?**

For the downstream component (Arrow LNG) surveys are being carried out on fauna, habitats and seasonal conditions. We are looking at mapping and ground-truthing and management and mitigation plans will be put in place. Qualified fauna catchers are required to report on and regulate fauna relocation.

The bottom line is that we are still at an early stage of investigating project impacts and cumulative effects. It is too early to tell at this stage. We will also look at offsets required for impacts.

There has only been one project reach FID at this stage. British Gas (BG) and Santos have had the most conditions put down on any project in history, both from the state and federally (1200 and 300 respectively). The last thing you want on the EIS is a condition and the companies do work very hard to mitigate these. The conditions will be what keeps the industry in check.

**19. The government is capping bores that have effects on the Great Artesian Basin (GAB). What effect will CSG wells have on the GAB and water supply?**

The Capricorn Basin is not part of the GAB but the Surat Basin certainly is. What we are talking about is “balancing” water in the Surat Basin, so that what we take out, we put back in. This would be the best solution and needs more investigation.

In the area that Arrow works (in the Surat Basin) there is an equivalent number of existing water bores to those that we are proposing to drill. It is a unique area as there is a high demand on water resources. There are strict regulation changes coming that include make good conditions, agreements, and baseline assessments. The legislation around water has tightened and Arrow is aware that water is a very critical issue that we need to get right.

**20. The Rio Yarwun refinery has engineering offices deliberately built right in the middle of the plant. Therefore, if it blows up they must take responsibility? Do you have a proposition for your CEO’s?**

LNG plants are designed and operated with very high regard to safety and security. One of the benefits of having Shell as our parent is that they have built and operate the majority of LNG plants in the world, and they are the leaders in all aspects of the technological and operational aspects of LNG, including shipping.

**21. The gentleman interviewed on the 7.30 report seemed to indicate the practice in the US will not be used here [this is reference to Josh Fox, producer of the movie “Gasland”]. The fracking process is the one we are not very keen on in this area because it is some of the best country in Central Queensland and has one of the best aquifers. We will take a very dim view if anything should happen to that aquifer.**

**People need to be aware, that CSG companies are not like coal miners, they are not out to buy your land at a premium, they want to use your land in agreement with you. Any disturbances are recoverable, I suggest you get compensation terms from the government and seek legal advice.**

**In the Surat properties are becoming completely unsaleable. Farmers are going to lock their gates and conduct a campaign of no negotiation until they can be sure there are no disadvantages.**

We don't hide from facing up to and discussing those issues; this is why we are here today, to answer your questions. We only ask that people keep an open mind, and make decisions based on facts and good science, and use their fair judgement when they hear all sorts of claims in the media.

On this issue of fracking, we are trialling its use in the Bowen Basin. We don't use the particular chemicals that are the focus of some of the Gasland claims. These chemicals, which are referred to as BTEX chemicals (benzene, toluene, ethylbenzene and xylene) are banned from use in fracking in Queensland. However, they are very common in our environment, and are present in many things that we all use everyday – e.g some types of plastic, foam, and also in hydrocarbon products such as petrol and grease etc. Benzene can also be naturally occurring.

Fracking is one type of process used in the CSG industry. We only frac if we have to, as it is expensive, and to date we are still very much in a trial phase. Only about 3% of the wells we have drilled to date have been fraced. In terms of Gasland, the CSG industry in Queensland is very different to a gas-shale industry in the U.S, with different geology, processes, history and regulatory regimes.

Some people will also be aware of a segment on the “60 Minutes” program, which showed a water bore producing gas. There have been water bores in the Surat Basin producing gas for many decades, with the first bores drilled there about 100 years ago. There are at least 700 water bores licenced to take water from the Walloon Coal Measures, which is the coal formation that has since about 2005 been targeted for CSG production. When a water bore is drilled down into a coal seam, and the seam water pumped out, then the seam is de-pressurised and the gas that is also stored in the seam released. In simple terms, a water bore that takes water from a coal seam is exactly the same as a CSG well. It is absolutely no surprise that those water bores then produce gas. The whole reason the CSG industry came to the Surat Basin was because of the records of gas being released from water bores.

In terms of property valuation, we are working with the government and valuers to better understand this issue, and to consider ways in which we may be able to respond and assist. While this issue is complex, and there are no simple answers, we clearly recognize its importance to landholders and communities.

On a positive note, we are aware that in some areas landholders welcome the benefit of having income from the compensation that we pay for wells, and indeed that it is a selling point for their properties.

**22. It is not just the wells, do you have to have gravel road access 24 hours a day?**

We need to have access to the production wells on a regular basis, so that we can inspect and maintain them. Whether the road needs to be gravel will depend on the type of country, but we will need reliable access. Including during wet weather, so gravel is most likely. We are very flexible in the location of wells, and can adjust locations to better suit land use, such as along fence lines etc. We try to minimize the number of times we need to visit wells, and use technology such as telemetry (basically remote control) to monitor the wells.

**23. So Arrow will basically rectify any impacts?**

Yes. We recognize that we are working on private property, and in most cases that property is the source of livelihood for the owner. If we have an impact on it arising from what we do, such as using areas for wells or other infrastructure, then we will compensate for it. Likewise, if we cause physical impacts then we will rectify them. At the end of a well's life, or before we are allowed to hand back the production licence to Government, we are bound to rehabilitate our physical impacts and essentially remove infrastructure that we installed. There are guidelines and laws about the level and timing of rehabilitation that is required.

**24. What about trigger points (does this help)?**

Trigger points are used in association with impacts on water bores or aquifers etc. They do help because they give us clear points where we may need to review our actions and either commence mitigation measures, or to stop an activity.

Due to the area and timeframe of our proposed activities, the only real way to monitor for impacts is by measuring against a baseline, and understanding things like seasonal fluctuation, impacts of other users of a resource, natural changes etc. Once this is understood, then we can identify when our actions are causing a change. It is best to have different points established which serve as a trigger for action. We are confident that the trigger levels will be the most effective means to manage impacts.

**25. What is the agreement we are agreeing to? Where does final agreement lie if one party does not agree?**

Under new legislation enacted last month CSG companies must enter into negotiations in good faith with landholders. If agreement is not reached within 20 days, there is a statutory process available to resolve any issues and problems. Typically we issue the landholder with a 'notice of intention to negotiate', which triggers the start of a 20 day minimum negotiation period. If after that time there is still no agreement, there is an arbitration process that provides an additional 20 days, this time with support from Department of Employment, Economic Development and Innovation (DEEDI) representatives who seek to ensure a balance of views and fair process. If there is still no agreement then issue can be raised to a dispute, which may then be referred to the Land Court within a period of 10 business days.

Arrow's very clear philosophy in approaching landholders is that the best way to start a long term relationship is not by going to Court. We recognize that a person's property is their home and in many cases their source of livelihood. We respect the rights and concerns of landholders, and work to gain access on fair terms, and to compensate for our impacts. We will work very hard to obtain agreement, and would not use heavy handed legal tactics as a matter of course. We recognize that good relationships are good business.

The government has recently created a new "land access code" which sets out best practice guidelines and mandatory conduct conditions for accessing and working on private property.

*Further information: for more information about the new land access laws please visit, [http://www.dme.qld.gov.au/mines/land\\_owner\\_occupier\\_information.cfm](http://www.dme.qld.gov.au/mines/land_owner_occupier_information.cfm)*

**26. The conservation council recently hosted a session with the Environmental Defender's Office (EDO). We would like to run sessions to let people know more, so if people have any questions they should please contact the conservation council.**

We also encourage anyone to look at the EDO website and legal aid. We have certainly had the EDO attend other sessions.

*Capricorn Conversation Council: <http://www.cccqld.org.au/> or (07) 4927 8644*

*Environmental Defender's Office: <http://www.edo.org.au/edoqld/home.html> or (07) 3211 4466*

*Legal Aid (Rockhampton): <http://www.legalaid.qld.gov.au/Pages/Home.aspx> or 1300 65 11 88 or (07) 4938 4162*

**27. At what point does your exploration program become publically available?**

We submit various Notices to Government about where we intend to drill exploration wells, and we also provide Notices to landholders advising when we will begin etc. Once we have finished drilling we submit all information to the Government, and this becomes publically available within a designated period.

We don't otherwise publicise our exploration program, as it is always subject to change due to the very nature of exploration, where we may need to modify our plans depending on the results we get. We tend to use sessions such as this one to publicise that we are, or will be, active in the region, and to let people know our plans and how we conduct our activities.

**28. Prior to Arrow coming onto a private landholder's property will Arrow provide and environmental management plan or baseline mitigation measures and procedures (such as for noise and washdown)?**

We can provide a copy of our Environmental Authority (EA) which sets out the requirements we are bound to observe. We can view and discuss our Environmental Management Plan, but please understand that these are valuable and proprietary documents and not something that we give away copies of, in the same way that other companies guard the systems and procedures that they develop. Also, it is best that we explain how our systems work, since reading them in isolation, and without understanding how we operate or the linkages to other plans and processes could give an incomplete understanding of our ability to comply with the environmental management plan.

In terms of things like washdown, we have adopted the recommendation and requirements set out in the Land Access Code, which were developed by the land access working group. The land access code deals with weeds and seeds.

**29. Your presentation on the drilling process was good, but if you come to my property and drill, can I get access to the drill log?**

Yes. For every well we drill we give a report to government that becomes publically available after 2 years. However, we have no problem in providing information from the well to landholders.

**30. Also is there an option for deferral?**

Yes. Deferral agreements, where we agree to finalise the terms of compensation at a later date, can be used to allow more time as either party sees fit.

**31. Once gas is taken from the coal seam, is the coal still viable for mining?**

Yes, once the gas is drained the coal is still intact, and the drainage does not affect the coal quality. Many underground coal mines must drain gas for safety reasons, so it has been done for many years.

**32. How efficient is CSG to burn, doesn't it still produces greenhouse gases? There is also a lot more energy used in its production than coal. Does it break even with coal? If we are trying to work towards carbon neutrality, is there any plan to offset CO<sub>2</sub> production?**

CSG is a fossil fuel and produces CO<sub>2</sub> when burned. However, by comparison to burning coal it is far less polluting, especially in terms of CO<sub>2</sub> emissions. Further, there are less emissions and impacts in the overall life cycle of CSG, since the extraction, treatment and transport of gas is far less energy intensive than mining and burning coal.

We see that CSG is a transitional fuel toward a carbon neutral future. It represents a step down in terms of emissions, which is a step in the right direction. We don't have any solid plans yet to offset our emissions, but we are conscious of the potential for a carbon constrained future, so it certainly features in our thinking.

**33. When it comes to the local area and gas extraction, who are you going to talk to get local knowledge for what might be impacted?**

In terms of environmental and land impacts, we employ a few methods. Usually we start with a desk top survey for a high level environmental assessment, which helps us to avoid major and obvious constraints such as endangered ecosystems. We then focus on specific areas and "ground-truth" the area. The most obvious person to talk to first is the landowner, so that we understand their land use issues, such as crop rotation, farming practices and so on. We have duties to aboriginal cultural heritage, too, and in this regard we normally engage relevant native title claimant groups in an area to conduct inspections and surveys of potential for us, so that we can be sure we know we are not impacting their cultural heritage. For our environmental inspections we use botanists to check on vegetation and fauna communities.

We try to make sure we consult with local people about how their land is used, and to be used, before we conduct our activities.

**34. How many people feel they are directly affected by Arrow's pipeline activities right now and not being consulted with?**

Our only activities are planning and checking on the route. We haven't started any construction or other major activities. That said, we do understand that people need information and certainty, and we will be contacting them as our plans and timing become more firm. We try to achieve a balance between not disturbing people too much vs giving them enough information so that they are comfortable in knowing what our plans are.

**35. Is the gas line expected to take over the infrastructure from Stanwell to Gladstone? Are they all going into the same industrial corridor?**

This is a possibility, however, we would prefer to follow the existing easements established under the Central Queensland Gas Pipeline.

**Comment [HK1]:** We need to check this statement with Ian Burgess

**Comment [igb2]:** CQP only followed the industrial corridor for the last 70km or so, however we may be in the corridor earlier. We are currently investigating all options for the pipeline.

In reality, due to AGL, we will most likely not use the existing CQP easements.

*Further information: for more information about the Arrow Bowen Pipeline please see the Arrow website: [http://www.arrowenergy.com.au/page/Projects/Central\\_Queensland\\_Pipeline/](http://www.arrowenergy.com.au/page/Projects/Central_Queensland_Pipeline/) or the Queensland Department of Infrastructure and Planning website: <http://www.dip.qld.gov.au/projects/energy/gas/central-queensland-gas-pipeline.html>*

## BLACKWATER

### 1. What are the socio-economic impacts and benefits?

At this stage all we are doing is exploration, which is fairly low key and intermittent. We use local contractors as much as possible, but the overall impact will not be great until we start to develop on a large scale.

If we were to develop this area it would bring various employment opportunities during both the construction and operational stages of the development. CSG is not a big an industry as mining, and we would estimate that it would take about 50 – 100 people to run a field in this area. A likely base for operations would be Blackwater or Duaringa.

We would say that the impacts are positive, in that they bring jobs and investment to the area, and set in place an industry with a long term future. Equally, we offer some different sorts of jobs and opportunities for people, so it builds the skill base across the region.

### 2. The wells for development south of Blackwater, would that be old Leichardt Pits which are not in use anymore? There was a lot of development a few years ago, how much of this information are you privy to?

We are well aware of the gas potential in this area, as evidenced by the gas explosions at the two Sirius Creek mines, and the gas outbursting problem at the old Leichardt mine. We have also drilled a pilot well in the area under the terms of an agreement with Xstrata, and it has confirmed the gas production potential of the area.

We certainly have enough information to let us know that this area has very strong potential for commercial gas production.

### 3. If everything goes according to plan will underground mining continue?

Yes, in fact our activities are complementary to mining, in that the gas we drain makes mining safer. Gas drainage from underground mines has been done for many, many years, and is a well established practice. We firmly believe that CSG and coal mining are mutually compatible and complementary industries, and achieve the best outcome for all.

### 4. How does the gas get out of the ground and into the pipelines?

Once we have a gas well in the ground, we pump water from the coal seam, which in turn allows for the gas that is also stored in the coal seam to be released. We install a pump in our

gas wells which removes the water from the seam, and the gas that is released can then travel via the well to the surface, where we pipe it to a central facility.

Coal seams are reservoirs for both gas and water. The water, which is under pressure from the weight of overlying rock strata, holds the gas in place. Once we remove some of the water, the gas starts to migrate to the well, where we can capture and pipe it.

**5. For the trial period (a pilot well), what happens to that gas?**

We flare the gas from pilot wells, since there is no other alternative, and besides, we are not allowed to commercialise (that is sell) the gas under the terms of our Authority to Prospect. The basic issue is that pilot wells are for testing purposes, and therefore used to provide the information that will determine whether we invest in pipelines and other infrastructure. Because they precede the infrastructure that would allow us to take the gas to market, we have no option but to flare the gas

*Further information: for more information about flaring in the coal seam gas industry, please see the government publication at*

*[http://www.industry.qld.gov.au/documents/LNG\\_Factsheets/Flaring\\_in\\_the\\_coal\\_seam\\_gas\\_in\\_dustry.pdf](http://www.industry.qld.gov.au/documents/LNG_Factsheets/Flaring_in_the_coal_seam_gas_in_dustry.pdf)*

**6. Is the fire risk to the land?**

No. We are very conscious of safety risks and we are constantly checking for new sources of risk, and to make sure our systems are managing those risks we have identified. When we flare gas, the flare is a pipe about 4m – 5m high, with hot gas burnt as it exits the pipe. It is not near ground level. We are also conscious of the potential for the wind to blow the flame, so we ensure the flare is located away from vegetation, and that the ground around it is cleared. We have not had fire problems due to flaring gas.

**7. Why are there are different sets of rules on methane emissions for landholders and miners/industry?**

At the moment there are no specific rules that control methane emissions, although it is clear that the topic of a carbon pollution reduction scheme and carbon tax is getting a lot of attention in Australia. We understand that the rural sector was to be exempted under proposed carbon emission legislation, whereas the resource industry clearly was not. We can't speculate as to the reasons why that was the case, but we will obviously comply with any new laws that are enacted by Government on this topic.

**8. Is there a list of property names? I received a letter, do you have more information as to which properties Arrow is potentially interested in?**

In the Blackwater and surrounding area we hold interests in Authorities to Prospect - ATP751, ATP759 & ATP831. It is possible to check the extent of these tenements via the Government website - [http://www.dme.qld.gov.au/mines/tenure\\_maps.cfm](http://www.dme.qld.gov.au/mines/tenure_maps.cfm) .

At the moment we are at early stage exploration in all of those tenements, so we are doing fairly broad scale work to assess their potential. If that exploration work is successful, we will then start to scale up the level of activity in terms of environmental assessment, access to market (e.g how we could get gas to the Moranbah – Gladstone pipeline etc), and applications for Petroleum Lease amongst other things. This will all take quite a few years, and we will be

back to update people as we get more information and certainty of timing and likelihood of further development.

In terms of specific letters that we send out, there is a government process to access land which requires us to issue a 'notice of intention to negotiate'. We do this by letter, and then follow up with a call to arrange to meet with the landholder and talk through any issues.

We have sent a number of letters recently, for exploration wells and for the Moranbah – Gladstone pipeline.

**9. At the moment ATP831 has the most potential but what about the areas around Blackwater, do they have as much potential?**

Yes – very much so. We have drilled a pilot well near Cook Colliery south of Blackwater and it demonstrated very favourable gas production, which is not unexpected given the history of issues with gas in underground mining in this region.

Our focus has shifted to areas north for the short term, but we are still very keen to develop the gas resources in the South Blackwater area. We are working in association with mining companies with a view to degassing ahead of their mining activities, which will represent a mutually beneficial arrangement that makes mining safer whilst finding a good use for the gas.

**10. It seems that you should be in Baralaba. There does not seem a great amount of potential for Blackwater's economy or the employment of Blackwater residents. What happens in Moranbah? Does your staff reside in town or in camps?**

It is true that our main focus at the moment is the area around Moranbah, which is simply due to the fact that it is where we started our first project, and has become our base. We will need to set up a southern base, as the distances are too great to cover from just one base.

The Blackwater area has real potential, and while the geology of the area is more complex in some ways, the amounts of gas here are also very high, so it is a very attractive area for gas development. Also, there are other major players in the area including QGC and Bow Energy, and I am sure that you will see gas developments in this region before too long. On the topic of QGC, we have joint venture arrangement with them in ATP831 and ATP759. A joint venture is simply a commercial arrangement to cooperate and work together, and the best example in this area is BMA – which is a joint venture between BHP Billiton and Mitsubishi. The joint venture originated when Arrow was an investor in Pure Energy and QGC bought out Pure Energy. Arrow is now a partner with QGC in this area only. Arrow is the operator of those two areas. That means it is Arrow's presence on ground and with landholder discussions. Outside of these areas, QGC have very large holdings with which we are not involved.

In terms of benefits to the town, Blackwater is an ideal base for us, since it is well located geographically, has good facilities, is accessible by air and is accustomed to resource industry developments. The benefits to the town would be measured primarily in terms of direct employment opportunities, including work for contracting firms, and greater diversity of employment.

In terms of local employment versus fly in/fly out, our very strong preference is for establishing a locally based workforce. While we can't force employees to live in the area, we try to make it as attractive as possible for them to do so, such as offering incentives to stay in local areas. Our operating philosophy is clearly that we get the best business benefit from having employees living locally.

**11. When the pipeline is established, will there be exclusion zones?**

We are still finalizing the engineering parameters of the pipeline, but the dimensions will be roughly - 600mm to 1000mm in diameter, buried to a depth of at least 750mm below ground, and situated within an easement 25m to 30m wide. Whilst the pipeline is being constructed obviously there will be need for temporary exclusion zones for safety reasons. However, laying of the pipeline can move very quickly so these periods are short.

Once the pipeline is installed and functional there are some restrictions to use of the land in the easement. Landholders will be compensated for loss of use of their land, until such time that the pipeline is decommissioned and the land rehabilitated.

**12. So the well-site is 10m by 10m, when machinery is in there in the exploration stage, is this fenced off? Cattle are very intuitive and equipment can't be monitored 24 hours a day.**

We address safety risks to people and stock at all stages of our works, whether at the exploration or production stage. As a minimum we fence off the ground pits we use to store water for drilling, and we may erect electric fences around the site to deter cattle from entering. For our production wells we install high, mesh fence enclosures that prevents any access by stock.