Overview of Arrow Energy

The exploration process

Exploration in the Styx Basin

Arrow Bowen Pipeline update

Community engagement

Questions
ARROW ENERGY
COMPANY OVERVIEW

Arrow is a leading coal seam gas company with five domestic gas supply operations, interests in three gas-fired power stations and plans to deliver liquefied natural gas to the international market through a world class plant in Gladstone.

• Queensland based company which started in 2000
• Joint venture Shell (50%) and PetroChina (50%) established owners committed to safety, environment and long term relationships with stakeholders
• Currently have almost 500 producing coal seam gas wells across Queensland
• Provide approximately 20 per cent of Queensland’s gas needs which is primarily used for electricity generation

中国石油天然气股份有限公司
PetroChina Company Limited
ARROW ENERGY
OUR STORY

Today's value $5bn (indicative)

First gas sold

Gross Reserve Position (PJ)

Listed at $20 m

$250m

<table>
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<th>Staff numbers</th>
<th>2007</th>
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<td>2010</td>
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*year to date
ARROW ENERGY
OUR PROJECTS

Arrow LNG
• Surat Gas Project
• Bowen Gas Project
• Arrow Surat Pipeline
• Arrow Bowen Pipeline
• Arrow LNG Plant
• Power Development

Domestic operations
• Tipton
• Daandine
• Kogan
• Stratheden
• Moranbah Gas Project

Power stations
• Braemar 1
• Braemar 2
• Townsville
ARROW ENERGY
WHERE DO WE EXPLORE?

54,088km² of acreage

- Bowen Basin – QLD
- Surat Basin – QLD
- Clarence Moreton Basin – QLD and NSW
- Nagoorin Graben – QLD
- Capricorn Area – QLD
- Styx Basin – QLD
- Hillsborough Basin – QLD
- Galilee Basin - QLD
• Our domestic gas and electricity supply business has been in operation since 2004.

• We currently supply approximately 20 per cent of Queensland’s gas needs which is primarily used to create electricity.
THE EXPLORATION PROCESS
COAL SEAM GAS (CSG)
WHAT IS CSG?

• Natural gas – methane

• Commonly used for electricity generation and industrial uses (eg refining)

• Coal seams contain both gas and water. The gas is kept in place by water pressure and ground pressure

• Gas is produced from coal seams by drilling wells, pumping water from coal seams, which allows the gas to be released

• CSG is very different to Underground Coal Gasification (UCG)
THE EXPLORATION PROCESS
RIGHT TO EXPLORE

- Right to explore provided by “Authority to Prospect” (ATP)

- Granted under the *Petroleum and Gas (Production and Safety) Act, 2004*

- Administered by Department of Employment, Economic Development and Innovation (DEEDI)
THE EXPLORATION PROCESS
WHAT DOES EXPLORATION MEAN?

• Exploration is a three step process to identify and assess the potential of coal seam gas (CSG) resources in an area to determine:
  1. The presence, depth and extent of coal seams
  2. Whether the coal seams contain gas
  3. Whether the gas can be ‘produced’ (ie brought to the surface)

• Exploration is one key part of deciding if a CSG resource can be developed into a project – also need to obtain environmental, Government and commercial approvals
THE EXPLORATION PROCESS
EXPLORATION DRILLING

• Landholder consultation

• Flexible approach

• Site inspection/survey (eg environment/vegetation/cultural heritage)

• Site preparation for drilling activity only (70m x 70m)

• Drilling and logging testing

• Cementing of well

• Drilling and testing timeframe – approx one month

• Rehabilitation of site
THE EXPLORATION PROCESS
EXPLORATION - SEISMIC SURVEYING

• Seismic surveying is a process that generates a 2-D image of the subsurface which helps determine the presence and extent of coal seams.

• The process requires acoustic signals to be passed through the surface of the Earth in straight lines, these are reflected by the interfaces of different rock types. The reflected signals are received by geophones and recorded for interpretation into a 2-D image.

• Advantages:
  • Low impact alternative to drilling
  • Can be conducted along existing roads in many areas
THE EXPLORATION PROCESS

BASICS OF DRILLING

• Hole diameter is about 120mm (5 inches)
• Hole depth depends of geology – but generally less than 800m
• Multiple strings of casing – isolation of well from surroundings
• Water flushed down the drill string to the face of the bit, to allow cuttings to be flushed back to surface
• Cuttings at surface are captured in a small ground pit
• All strings cemented in place to isolate any aquifers
• Qualified drilling personnel
• Strong safety focus – lifesaving rules
• Site rehabilitated after drilling

• Exploration wells will not be converted to production wells
THE EXPLORATION PROCESS
EXPLORATION DRILLING

Exploration wells
• Chip hole - to determine presence of coal
• Core holes – to determine gas contents
• Exploration drilling is low intensity, sites several kilometres apart
• Level of site preparation deemed necessary in consultation with landholder and assessed on case by case basis

Landholders are compensated in accordance with the Petroleum & Gas Act
• 3-6 weeks duration depending on depth and type of exploration hole
• Small, truck mounted rigs and support vehicles (water, drill rods, personnel transport, testing services etc)
THE EXPLORATION PROCESS
PILOT TESTING

- Drilling up to five individual wells
- Wells in close proximity (between 100m – 500m apart)
- Water and gas brought to surface – water stored in small purpose-built dam
- Pilot testing may last up to 18 – 24 months
EXPLORATION IN THE STYX BASIN
ARROW ENERGY
STYX BASIN EXPLORATION ACTIVITIES

• ATP 700 (Styx River) extends for approximately 55km from east of St Lawrence in the north to west of Marlborough in the south.

• Arrow is exploring the area covering the northern part of the tenement area centred on Ogmore at present.

• During coal exploration and production activities in the Styx Basin between 1887 and 1948 there were reports of gas from the drill holes and in the mines.

• Arrow has had favourable results from drilling activities to date prompting further exploration in 2011 and 2012.
From 2005 to 2010 four exploration wells were drilled in the ATP700 area:

- Styx River 1 (2005)
- Styx River 2 (2007)
- Styx River 3 (2007)
- Styx River 8 (2010)

Results from these wells indicated that the Styx Basin may be prospective. However, the 2011 exploration program was developed to further assess the potential of the area.
CSG EXPLORATION
EXPLORATION ACTIVITIES

• Three additional wells were planned as part of the 2011 exploration campaign:
  • Styx River 4 (delayed until 2012)
  • Styx River 5 (completed)
  • Styx River 6 (completed)
CSG EXPLORATION
EXPLORATION ACTIVITIES

• Two more wells are planned for 2012, most likely in the northern area of the tenement
• Potentially one pilot well will be drilled to test the production potential of the northern area
• A 50km seismic program is also planned within the central area of the tenement
• Beyond 2012 eight more exploration holes are planned, spread across the tenement, as well as one additional production pilot to evaluate the production potential of the southern basin
• A 30km seismic program for the southern basin planned for 2013-2014
ARROW ENERGY
PRODUCTIONAL COAL SEAM GAS WELL AT SURFACE
ARROW BOWEN PIPELINE UPDATE
ARROW BOWEN PIPELINE UPDATE
RECENT ACTIVITY ON THE ARROW BOWEN PIPELINE (ABP)

Arrow Bowen Pipeline (ABP) update

• Pipeline Survey Licence
• Environmental Impact Statement (EIS) terms of reference
• Two ecological field surveys
• Contacted all potentially affected landholders

Next steps (6 – 12 months)

• Continue discussions with landholders
  – negotiate access to conduct detailed ecological assessments and cultural heritage surveys
  – landholders will be shown detailed alignment plans for discussions regarding easements
• Plan to submit the EIS in December 2011
  – sent to landholders and also available in community libraries
  – information sessions will be held to discuss the EIS in 2012
ARROW BOWEN PIPELINE UPDATE
ARROW BOWEN PIPELINE (ABP) IMPACTS

Arrow Bowen Pipeline (ABP)

- Proposed 600km long buried steel transmission pipeline
- Up to 650 jobs during construction
- Five temporary camps along pipeline route

Roads

- Under the Petroleum and Gas Act, Arrow must adhere to “notifiable road use” standard
  - Compensation and upgrade/maintenance requirements over 10 000 tonnes per year
- Road and traffic management plans will be developed in collaboration with local Councils
Employee committees assess applications for donations, sponsorships and partnerships on the following focus areas:

- Health and safety
- Education
- Environment

Successful applicants in the regions to date include:

- Isolated Children’s Parents’ Association
- Outback Barbarians Rugby Club
- Camboon Campdraft & Recreation Club Inc
- Birri Indigenous Organisation
- Theodore District Health Council Inc.
- The Salvation Army (Qld) Property Trust for Samaritan House Mackay
Questions and Answers

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Email: info@arrowenergy.com.au