Community Information Session
Surat Basin
May 2011
INTRODUCTION OF PRESENTERS

- Tony Knight, Vice President, Exploration
- St John Herbert, Groundwater Modelling Coordinator
ARROW ENERGY
WHAT WE WILL COVER TODAY

- Company Overview
  - Domestic Gas Operations
  - Brighter Futures

- Surat Gas Project Update
  - EIS status
  - Exploration & Pilot Wells
  - Pipeline
  - Compensation framework
  - Approach to co-existence on intensively farmed land
  - Groundwater

- Your questions
ARROW ENERGY
COMPANY OVERVIEW

- Queensland based company – started in 2000, first gas sales in 2004
- Currently supplies >20% of gas & electricity needs of Queensland
- 50/50 Shell and PetroChina – 2 stable owners committed to safety, environment and long term relationships with stakeholders
- 630 staff in Dalby, Moranbah and Brisbane
Arrow’s domestic gas and electricity supply business has been in operation since 2005

Includes

- Kogan North
- Daandine
- Tipton
- Dalby Expansion Project
Resolved Sunday’s gas release incident in the Daandine field

Filled the well with dense drilling fluids

Capped and secured the well

Well retains integrity, below and above ground

Commenced immediate investigation
COMMUNITY PROGRAMS
BRIGHTER FUTURES

- Brighter Futures based on understanding that our operations depend on a social licence to operate
  - Surat Basin Gas Industry Aeromedical Retrieval Service
    - Joint gas industry service to respond to critically injured personnel in remote areas
    - Three community rescues to date
  - Donation and sponsorship assessed by local employee committees
COMMUNITY PROGRAMS
BRIGHTER FUTURES AND REFERENCE GROUPS

- Six university scholarships
  - 1 x USQ student studying Engineering – offer being made by end May
- Partnership with Dalby State High School
  - 16 students training in Hydrocarbon Processing at Arrow facilities
- Arrangement with Southern Queensland Institute of TAFE
  - 34 Arrow Dalby employees to study Hydrocarbon Processing
- Three indigenous trainees currently working at Arrow in Dalby

- Arrow Surat Community Reference Group
- Arrow Intensively Farmed Land Committee
  - Working to identify improvement opportunities and implement coexistence strategies, eg Work Method statement for drilling exploration core holes
SURAT GAS PROJECT UPDATE
SURAT GAS PROJECT UPDATE

EIS STATUS

- Pre-work
- Final Terms of Reference
- Undertake impact assessment
- Prepare EIS
- Exhibit EIS for public comment
- Qld/Commonwealth Government decision on project
- Final Investment Decision
- Project construction and start up

Timeline:
- QCLNG - FID
- GLNG - FID
- APLNG - Expected FID
- Arrow - Expected FID

Years:
- 2010
- 2011
- 2012
- 2013
- 2014
- 2015
- 2016
- 2017
- 2018
SURAT GAS PROJECT UPDATE

EXPLORATION

- Exploration work is continuing in order to confirm viable gas supply for Arrow LNG Project

- Exploration involves identifying:
  1. Presence, depth and extent of coal seams
  2. Whether coals seams contain gas
     - core holes
  3. Whether gas can be produced and brought to the surface
     - pilots
SURAT GAS PROJECT
EXPLORATION – CORE, CHIP AND PILOT WELLS

- Exploration works completed to date in 2011:
  - 9 – Core wells
    - 5 in ATP683
    - 3 in ATP689
    - 1 in ATP810
  - 5 – Pilot wells
    - ATP810 (Burunga Lane pilot)
SURAT GAS PROJECT
EXPLORATION IN ATP689 (GOONDIWINDI – MILMERRAN)

EXPLORING SOUTHERN LIMIT OF SURAT BASIN

RIGS AT WORK NOW
SURAT GAS PROJECT
PILOT TESTING – ATP683

- River Road and Glenburnie Pilot plan:
  - Build 400 ML dam at Arrow’s Hillview site
  - Negotiating to build pipeline from River Road site to Hillview
  - Build local holding pond at Arrow’s Glenburnie site
Arrow Surat Header
Pipeline plan:

- Application to DEEDI for construction of 110km pipeline
- Will be subject to separate approval process
SURAT GAS PROJECT
DEVELOPMENT AREAS AND TIMING

- Target area for development between 2013 and 2023:
  - ~ 2,000 wells

- Production wells:
  - ~ 15 wells in next 12 months
You told us you want:

- Landholders’ time considered in the negotiation process
- Different land types to be recognised for compensation
- Independence and transparency for compensation

We have ensured:

- Landholder time component is included
- Five different categories of land type used to calculate compensation
- Independent third party valuations form basis of compensation calculation
COMPENSATION
NEW FRAMEWORK FOR EXPLORATION ACTIVITIES

- Developed and implemented new compensation framework for exploration activities

- New compensation framework for production activities under development

- Our new exploration compensation is based on:
  - An allowance for Landholders’ time
  - Land value as defined by a third party
  - Impact on operations and amenity (e.g., disturbance, loss of profit)
  - Change in value and/or use of land
  - An upfront allowance for legal, valuation and accountant advice
Landholders on the Arrow Community Groups have asked Arrow to “add value’ rather than just compensating for impacts (a nil sum game)

- We acknowledge that intensively farmed land requires a different approach for the gas industry to co-exist with an important agricultural industry

- We have heard the compensation concerns raised in the BSA Blueprint

- We need a framework that provides consistency and fairness in our negotiations

- Arrow has asked lead landholder groups to qualify what the term ‘added value’ looks like

- Arrow has already committed to
  - implement a Standard Compensation agreement;
  - remove the privacy provisions where a landholder requests it

- We will also commit to a range of standard options in our agreements (ie legal costs; road specifications; traffic conditions) to get the best alignment of the interests of the individual landholder and Arrow
SURAT GAS PROJECT
APPROACH TO INTENSIVELY FARmed LAND

- ATP 683 covers a substantial area of the Condamine Floodplain

- Arrow acknowledges that CSG development will require a best-practice, co-ordinated approach

- Seeking to better define eastern coal boundary with the view to reduce the size of ATP 683
SURAT GAS PROJECT

APPROACH TO INTENSIVELY FARMED LAND

Exploration & Appraisal

- Pitless drilling trials to commence in June
- Intensively Farmed Land specific project management including dedicated rig and crew
- Mobile wash down units to be used
- Improved drilling fluids management
- Time-lapse photography to demonstrate the lifecycle of activities
- No fraccing in Surat Gas Project area
SURAT GAS PROJECT

APPROACH TO INTENSIVELY FARMED LAND

Field Development

- Flexibility in well locations and spacing eg from 0.8km to 1.5km

- Studying methods to minimise impacts and maintain soil profile for gathering system pipelines:
  - Fully understand soil types in the region
  - Use plowing rather than trenching
  - Burial to 1.5m depth

- Discussions with farmers for three field development case studies on SCL (various farming practices)
Transmission Pipeline Development

➢ Trial of constructing and restoring a transmission pipeline on intensively farmed land in 2012

➢ World leading practice to demonstrate:
  ➢ soils can be removed and replaced in layers to maintain the existing soil profiles; and
  ➢ the area can be rehabilitated with precision to minimise impacts on farming businesses
GROUNDWATER MANAGEMENT STRATEGY
Substitution of Allocations

**Salt Management**
- Commercial Products
- Collaborative Approach
- Regulated Landfill

**Extraction**
- Reduce pressure in Coal Seam allows flow of Gas

**Treatment**
- As Required
- Appropriate fit-for purpose water for beneficial use

**Substitution of Allocations**
- Maintain Water Balance
- Natural Recharge
- Make Good

**Beneficial Use**
- Irrigation
- Town Water Supply
- Industrial Use

**Groundwater Modelling & Monitoring**
- Monitoring Program
- Impact Assessment
- Quality and Levels

**Potential Mitigation & Contingency Measures**
- Injection
- Disposal
GROUNDWATER MODELLING

- Updated 2010 model
- 450km x 270km area
- Incorporates EIS development scenarios
- Independent peer review
- Impact Report - EIS
GROUNDWATER MODELLING

- Based on Arrow geological model of the basin

- Model developed by Schlumberger over the past 18 months and includes geological information from over 10,000 bores and water level data from 4000-5000 bores, obtained from:
  - Arrow bore information
  - Queensland Petroleum Exploration Database
  - DERM Queensland Groundwater Database

- The model includes:
  - Approximately 1.5 million cells
  - 15 layers within the model from the Condamine Alluvial Aquifer to the Precipice Sandstones

- Preliminary results recently received – independent verification ongoing
- Arrow’s contribution to QWC groundwater model is ongoing
GROUNDWATER MODELLING
Preliminary Findings

- Condamine Alluvium
  - Prioritised the Condamine results
  - Preliminary results:
    - Cumulative impact of all CSG proponents
    - Without mitigation
    - Max. impact occurs 2065:
      - 1m - 4m
      - Western portion
    - Incremental to other impacts
- Present complete results by September/October 2011
STRATEGY FOR MITIGATION & ‘MAKE GOOD’

- **Substitution** of existing **groundwater allocations**
  - Ensure *net take* is **minimised** - as close as possible to pre Arrow production
  - **Loss limited** to volume of concentrated brine or evaporation removed from the system
  - **Offset** CSG take to remain in line with current usage and plans
  - Facilitate **natural recharge** of alluvial aquifers
  - Most **effective and efficient** means of mitigation

- If **additional** mitigation is required:
  - Consider deep **injection** into target aquifers (current trial)
GROUNDWATER MONITORING

- **20 – 50 monitoring wells** in the next 12 months
- Aquifers **overlying and underlying** the coals including:
  - Condamine Alluvium
  - Aquifers in GAB
- **Priority areas** around:
  - Existing producing wells
  - Appraisal wells
- **Future** program:
  - New production
  - New appraisal areas
MONITORING & ‘MAKE GOOD’

- **Baseline Assessment**
  - Initial assessment of all bores in Tenure Area
  - Preparing Plan for DERM showing priority order

- **Bore Assessment**
  - Immediately Affected Area
  - Identified bores - Underground Water Impact report
  - Make Good Agreement
    - Outcome of assessment
    - Identify potential for impairment
    - If Impaired Capacity – ‘make good’ measures

- **Groundwater Monitoring**
  - Arrow network plus some DERM and landowner bores

MAKE GOOD EXAMPLES

- Reset pumps at deeper levels within bores
- Deepen bores to provide water
- Replacement bores
- Provide alternative supply
- Monetary or non-monetary compensation
SUMMARY

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- Activities Update
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  - Compensation framework
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Questions & Answers

- Freecall: 1800 038 856
- Email: suratgas@arrowenergy.com.au
GREAT ARTESIAN BASIN
Resilience of the GAB

- 8,700,000 GL – Volume Stored in GAB
- 25 GL/yr - Arrow abstraction
  0.00029% of GAB Volume per year
- 3400 years to drain - If assume 1% of GAB is recoverable water
- 200 GL/yr lost from:
  - Uncapped bores
  - Unlined drains

Source: GAB Coordination Committee