Moomba 191 and Beyond

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28 August 2013
Session outline

1. Santos unconventional history
2. Operational learnings
3. Cooper Basin investment
Santos unconventional footprint

Portfolio of multiple play types spread across eastern Australia

**Today’s focus**
- **Cooper Basin**
  - Conventional
  - Tight gas
  - Deep coal
  - Shale

- **Surat/Bowen Basin**
  - Coal seam gas

- **Gunnedah Basin**
  - Coal seam gas

- **McArthur Basin**
  - Liquids-rich shale play

- **Amadeus Basin**
  - Conventional oil and gas
Santos in the Cooper Basin

Over 50 years of E&P experience with a pioneering unconventional resource program

Australia’s first dedicated shale core, gas desorption and fracture stimulation program (Moomba 175)

Australia’s first contingent resource booking for shale* (Moomba 191)

Drilling of dedicated shale reservoir well (Dec 2011) (Moomba 191)

Australia’s first commercial shale production

2004
2005
2006
2007
2008
2009
2010
2011
2012

Dedicated Cooper Basin unconventional reservoir team formed

Deep coal fracture stimulation with producing hydrocarbon (Moomba 77)

Detailed design of specific shale targeted gas well

Shale targeted core & log evaluation (Moomba 185)

Moomba 191 fracture stimulation (Mar 2012)

* Contingent resource booking for shale, deep coal and mixed lithology
Santos understands the Cooper rocks

Santos has significant understanding of the Cooper Basin and Moomba REM continuity and thickness trends

- 50+ years of operational subsurface data
- >4,000 feet of core
- >300 fracs

Moomba REM

- > 940km² (363 sq mi) of 3D seismic coverage
- 106 wells drilled through the REM

* REM – Roseneath, Epsilon and Muturee shales zones

We have the energy.
Moomba 191 success

Australia’s first commercial shale production commenced 28 September 2012

- Initial flow rate
  3 mmscf/d

- Current flow rate
  2 mmscf/d

- Location close to existing pipeline and infrastructure allowed quick tie-in
  - 8km (5mi) to Moomba Plant
  - 350m (1150ft) to tie-in
Leveraging existing infrastructure

Santos operates and jointly owns all major infrastructure and processing facilities in the Cooper Basin

- 550 TJ/d sales gas capacity (519 mmcf/d)
  (Moomba & Ballera with plans to expand)
- 70 PJ gas storage (66 bcf)
- 6,000 km flow lines (3,728 miles)
- 100,000 horsepower satellite compression
- Access to East Coast gas market
- Firm pipeline capacity from Moomba to Wallumbilla gas hub
Beyond Moomba 191

- 85 Tcf of gross technically recoverable unconventional gas
- 9 well, $200m gross program over 2yrs
- Two play focus:
  - Basin Centred Gas (Gaschnitz 1)
  - REM shale (Moomba 191)
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CSG drilling cost reductions

Significant time and cost efficiencies are continuing to be achieved as a result of:

- Reduction in number of well designs
- Focussed regional campaigns has led to a factory drilling approach, lowering costs

**Roma**

- 14% reduction in drilling costs for Roma deviated wells in Q1 2013
- >40% reduction since FID

**Fairview**

- 19% reduction in drilling costs for Fairview deviated wells in Q1 2013
- >30% reduction since FID
COWRALLI MULTI-WELL PAD PERFORMANCE

COWRALLI MULTI-WELL DRILLING & SIMOPS

IMPROVING OPERATIONAL EFFICIENCY

Projected:
- 15-20% cheaper than a single well
- ~55% lease size reduction per well
- ~50% frac savings
- Rig moves down ~4 days to <1 day
- Average frac stages/d up ~1.5 to ~4
- Connection time down ~25%
- Well payback period reduced by ~12 months

Multi-well Pad 1
SIMOPS control location

Multi-well Pad 2

Santos
We have the energy.
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Cooper Basin investment

Focussing on increasing volume and reducing costs to deliver a higher margin business

1. Existing facilities reliability

- Reliability
  - Maintenance strategies delivering record facilities utilisation, production and cost benefits
- Readiness for 2015 delivery
  - Planned Cooper Basin major outages over 2013-15

2. Upstream development

- Well-head production capacity
  - Growing through increased drills, productivity and efficiencies
- Cost reduction step-change
  - Multi-well pad drilling technology
  - SIMOPS approach to drilling, completions and connections

3. Cooper Infrastructure Expansion Project $800m gross Stage 1 spend 2013-17

- Stage 1 In-field
  - Expansion of four key field compression stations
  - Installation of new trunk pipelines between Moomba and Gidgealpa

- Stage 1 Moomba Gas Plant
  - Install new Moomba CO₂ train for removal of additional 1,000 ktpa
  - Installation of new Moomba export compression to enable firm sales gas transport from Moomba to QLD
Australia’s unconventional opportunity

- Significant resources underpinned by unprecedented Asian demand for energy
- Australia well placed to adopt NA shale lessons with early positive results
- Limited infrastructure means access to processing and marketing will be critical
Moomba 191 and Beyond

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