

CSG Queensland Study Trip	
<b>Notes taken by David Koppers and Matthew Todd-Jones</b>	<b>Date:</b> Monday, 5 June and Tuesday, 6 June 2017
<b>Project:</b> Coal Seam Gas	
<b>Location:</b> GLNG Project: Roma and Gladstone	
<b>Purpose:</b> To inform Commissioners about coal seam gas extraction processes.	
<p><b>5 June 2017</b>  <b><u>Roma Gas Fields and surrounds</u></b></p> <p><b>Attendees:</b></p> <p>PAC Members:  Lynelle Briggs, Robyn Kruk, Roger Fisher, Andrew Hutton, Ross Carter</p> <p>PAC Secretariat:  David McNamara, David Koppers and Matthew Todd-Jones</p> <p>Santos:  Neale House – Manager Environment and Water  Peter Mitchley – General Manager East Coast Gas  Bruce Clement – Vice President  Andrew Snars – Maranoa Regional Manager  Carlee Miller – Senior Adviser Community</p> <p><b>Santos Presentation – Roma Gas Fields</b></p> <ul style="list-style-type: none"> <li>• Santos has been operating in Roma for 50 years.</li> <li>• There have been few complaints about the project in recent years.</li> <li>• There is a culture of buying materials locally.</li> <li>• Water storage, reverse osmosis and salt crystallisation are part of the process in Roma.</li> <li>• Water then released is used for irrigation, stock watering, construction, dust suppression and there are managed releases back into the environment.</li> <li>• The process of gas extraction and then fracking was explained.</li> <li>• 30% of seams in the Roma LNG area are fracked, almost all are fracked in the Cooper’s Basin, South Australia.</li> <li>• There are 2,650 production wells across 6,900 square kilometres of gas fields. This is roughly 3 times the size of the Narrabri proposal.</li> <li>• Well pads are around 150 metres x 150 metres in size and are not generally constrained by space. The larger the pad, the more cost effective it is as all infrastructure can be contained on the pad footprint.</li> <li>• The wells have an estimated gas output of approximately 2 terajoules per day, depending of the life cycle of the well and operating efficiency at any given time.</li> <li>• There is monthly operational monitoring of the soil in areas used for treated water irrigation.</li> <li>• 420 km high pressure gas transmission pipelines used to transport gas from the CSG fields to the LNG processing and export facility at Gladstone.</li> <li>• There are 300 private landholders across the Roma Gas Fields project site.</li> <li>• Workers either travel locally to work or stay at the camps where a usual rotation is 2 weeks on and 2 weeks off.</li> </ul>	

### **Santos Presentation – Narrabri Gas Project compared to Roma Gas Project**

- Every CSG project site is different due to varying geological compositions.
- The Narrabri project is much smaller than the Roma operations in all aspects, the Roma project is roughly 3 times bigger than the Narrabri project.
- Outlined the history of the process of seeking to develop facilities in the NSW Pilliga region.
- Coal seams in Narrabri are already naturally fractured and fracking is not expected to be required.
- NSW currently imports 95% of gas. The Narrabri project could supply up to 50% of NSW's demand, equating to 200 terajoules per day.
- There will be no exportation of Narrabri gas, as it will be for the NSW domestic market only.
- The operational area for the Narrabri project accounts for only 1,000 hectares or approximately 1% of the total 95,000 ha project area.
- The sites are not located in a National Park, nature reserve or on BSAL land.
- The footprint of the gas well pads will be approximately 100m x 100m (on average).
- There have been no cases in the United States or Australia where fracking for coal seam gas has contaminated an aquifer.
- There is a fracking inquiry in the Northern Territory in which Santos is participating.
- As the Narrabri gas is for domestic use, a pipeline is proposed to be built southwards to connect with the Moomba-Sydney supply (subject to a separate approvals process), rather than north to Gladstone for export.
- At this point in time Santos understands that not all NSW Government agencies consulted during the exhibition period have formally provided their response to the Department. It is challenging getting departments or agencies to discuss issues directly with Santos.
- With coal seam gas they will be looking at a 12-13% return on investment whereas conventional gas is usually more like 25%.
- Santos would like to see quantifiable/prescriptive conditions as opposed to subjective style conditions. They contend the nature of the conditions can influence the level of investment they receive, e.g. Field Development Protocol – if this had to be revisited every 3-5 years then investors wouldn't take the risk. They described this as a type of sovereign risk for their business if they have to revisit issues every so often.
- There are still appraisals to undertake for various issues, which are outlined in the EIS.
- By the end of 25 years they would hope to have drilled less than 850 wells as it is more economical.
- Any flare burn is controlled and the flame can't be taken by the wind to affect its surroundings.
- The Narrabri project will have reverse osmosis and crystallisation processes onsite before water is capable of being used for irrigation, stock watering, construction, dust suppression and managed releases to watercourses.
- The maximum output of water through the Reverse Osmosis process will be 10 megalitres per day.
- There will be a brine dam and Santos are currently looking to see what they can do with excess salt which may be as much as 48 tonnes per day at peak production.
- The location of wells can change as more are sunk. You learn more about the seam and where the more accessible gas resides and that influences future direction / location of specific wells. This is why they are seeking flexibility in the well pad locations and the preference for the post approval field development protocol to allow for adjustments and monitor impacts against agreed upper limits.
- The degree of flexibility being sought slightly greater than what is common place for micro-siting in relation to wind turbines.

**6 June 2017**

**Curtis Island LNG Plant visit, Gladstone**

**Attendees:**

PAC Members:

Lynelle Briggs, Robyn Kruk, Roger Fisher, Andrew Hutton, Ross Carter

PAC Secretariat:

David McNamara, David Koppers and Matthew Todd-Jones

Santos:

Neale House – Manager Environment and Water

Bruce Clement – Vice President

- Gas is transferred to Santos' LNG facility at Gladstone where it is cleaned and cooled down in three stages to -160 degrees where it liquefies, which is a far more efficient form for export as the gas reduces significantly in volume when it liquefies.
- There are 3 LNG plants on the island, with one run by Santos.
- There are 140,000 cubic metres of gas in each of the 2 LNG storage tanks.
- Footprint of Santos LNG facility takes up 5% of the island and employs 100-120 operational staff.
- It takes around 12-15 hours to load a ship, with 8-10,000 cubic metres loaded per hour.
- The plant was in shutdown mode for a maintenance and warranty check at time of inspection.
- The gasfield, pipeline and LNG facilities were all packaged under one main approval from the Queensland government.
- The LNG plant is currently not operating at full capacity due to the lack of gas supply.

**Tour of Gladstone and surrounds (PAC only)**

The Commission toured around a range of other infrastructure sites in the immediate vicinity of Gladstone

- Coal loading facilities in the harbour
- Alumina plants – Bauxite transported in from Weipa to a washery west of town and then conveyor and shipping transfer to the Parsons Point alumina plant on the eastern side of Gladstone for processing.
- Alumina then transferred by conveyor south to the Boyne island aluminium production plant.
- Gladstone Power station was originally built in the 60's/70's to provide power supply to the alumina & aluminium plants which at the time were drawing up to 11% of the State energy. It is an old technology coal-fired station.