

# Narrabri Gas Project CCC Information Request Response

<p><b>Reference:</b></p>	<p><b>29.3 Information in response to questions raised at the October CCC meeting, and later submitted in writing, by the People for the Plains delegate</b>  <b>Note from delegate:</b> These questions only relate to PEL 238 and the Narrabri Gas Project and are centred around the gas and petroleum industries acknowledgement of the problems that Sulphate Reducing Bacteria cause. All questions have been researched before being presented</p>
<p><b>Requests and Responses:</b></p>	<p><b><u>Question 1</u></b>  Is the outer cement used on all the gas wells in PEL 238 of a type that resists Sulphate Bacteria attack?  If so then-  Q1a —When was the cement first used? What wells have this cement?  If it was not used then—  Q1b --What are the reasons for not using this type of cement?</p> <p><b><u>Answer:</u></b>  The wells are cased with carbon steel set in engineered concrete.</p> <p>Sulphate Reducing Bacteria (SRB) are ubiquitous and can be found in many natural and engineered environments where sulphate is present. Most commonly where anoxic conditions exist, but they have been found in oxic environments. SRB live in environments such as river beds, the beach, deep wells, seawater and water plumbing systems. These bacteria usually flourish on the hot water side of a water distribution system.</p> <p>Sulphate reduction can occur over a wide range of pH, pressure, temperature, and salinity conditions. Often sulphate and sulphur reduction is apparent from the smell of hydrogen sulphide (rotten egg smell) and the blackening of water and sediment by iron sulphide. For example, scrape the heel of your shoe along the sand at the waters edged of the beach front and the blackened sand is a result of naturally occurring SRB activity.</p> <p>SRB out-compete methanogenic bacteria if any sulphate is present in the groundwater system. Methane is therefore not produced with coalbed waters that contain significant concentrations of sulphate. The geochemical evolution of groundwater recharged in coal-bearing beds results in rapid biochemical reduction of any sulphate present, precipitating sulphides, thereby depleting the sulphate. Methanogenic bacteria are then free to consume the organic material and produce methane. There is thus almost always exclusivity between CSG wells and wells where SRB may exist.</p> <p>Santos has no SRB in its PEL 238 wells.</p> <p>The casing and steel used in Santos’ bores are adequate for the environment they are in, without taking extra precautions for a bacteria not present in our systems.</p> <p><b><u>Question 2</u></b>  Has the relevant enforcing bodies’ information on this cement type?</p> <p><b><u>Answer:</u></b>  Please check with the relevant regulatory bodies.</p>

**Question 3**

Will Santos provide to the wider community information on this cement and how it achieves its SRB resistance?

**Answer:**

SRB is not a significant risk. It does not exist in Santos' wells and if it were present it can easily be treated using an oxidant and circulation.

**Question 4**

In light of the debate over the long term water quality security and cross contamination after plug and abandonment, if the Sulphate Reducing Bacteria Resistant cement was not used then what guarantees will Santos give that the outer cement casing will not eventually breakdown and allow aquifer cross contamination?

If it has been used the above question still stands, but with the following extra questions.

a) Will Santos provide to the wider community the test results into any performance studies done to back up the amount of Sulphate Reducing Bacteria resistance and expected longevity of the external protection sealing that the cement has, also well pipe internal information if available? If Santos will not comply with this request then what are their reasons?

**Answer:**

SRBs are not present in Santos' PEL238 wells

**Question 5**

Sulphate Reducing Bacteria resistant cement is harder and takes longer to set than the normal cement used for the outer sealing arrangements and also longer than the normal plugging cement. As this cement is harder than the normally used cement and as such is less tolerant to movement. It is also more inclined to lose some of its bonding properties when passed through water.

a) Will Santos describe how they are overcoming the above properties of this cement and what monitoring along with repair techniques will both Santos and the lead Regulator employ should problems arise,

ii) while the well is in operation?

And:

iii) after plug and abandonment has occurred?

**Answer:**

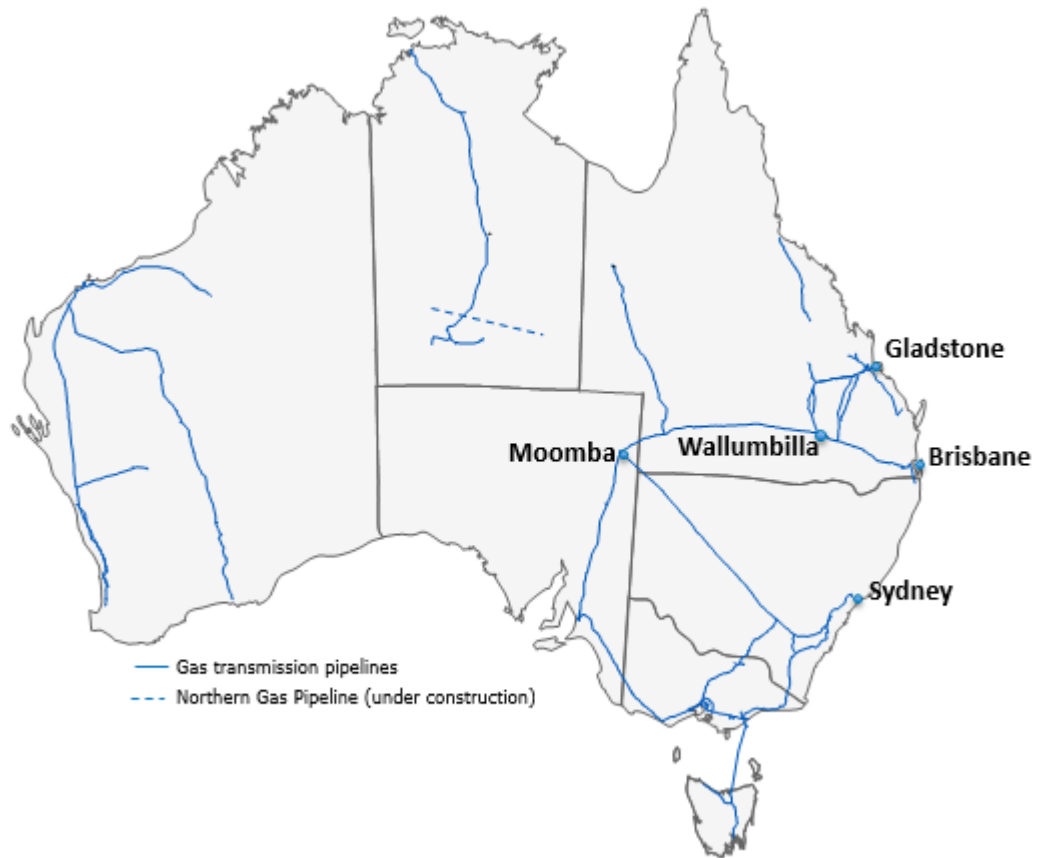
These questions are not applicable

**Question 6 – Gas Pipelines:**

Can Santos supply to the CCC a map showing all the gas pipelines routes that Santos uses to supply the NSW market and the Queensland gas export terminal from their owned and/or operated gas fields?

**Answer:**

Santos uses all of the connected pipelines on the east coast (shown in blue) to deliver its gas to NSW and Queensland gas buyers.



**Note from delegate re. Tooraweenah:**

As the Chair bought up the subject and was at pains to explain the coal/gas situation in that area, I have been asked to request of Santos some clarification. I agree that this is outside the scope of the NGPCCC but the Chair bought up the gas situation in Tooraweenah in reasonable detail and as such the local community does deserve an explanation. I have two slides from 2 separate presentations given by Santos to Shareholders one in 2011 and the other in 2014 that clearly show that Santos was/is interested in the area as a possible source of coal seam or conventional gas. As Santos has virtually stopped exploration in all the other PEL's that it holds and as the Chair at the August CCC indicated that his search of coal records in the Tooraweenah revealed that there was little to no CSG in the coal:

**Question:**

Will Santos now inform this CCC and the residences of the Tooraweenah area exactly what they intend to do in that area and has Santos found commercial quantity CSG in the Tooraweenah area?

**Answer:**

We have not discovered commercial gas in the Tooraweenah area. It does not seem likely to have commercial gas, but we don't know for certain. It may have potential and we may want to study it in the future. Not all of the area covered by our Petroleum Exploration Licences have economic prospectivity. If we were going to explore further in the Tooraweenah area we would engage with the local community beforehand.

For reference, the slides included in the delegate's information request are included below.

# Exploration, appraisal and development pipeline

Increasing resource maturity

## Narrabri (PEL 238):

- 1,520 PJ 2P reserves booked to date (gross)

## Bando (PEL 1 and 12):

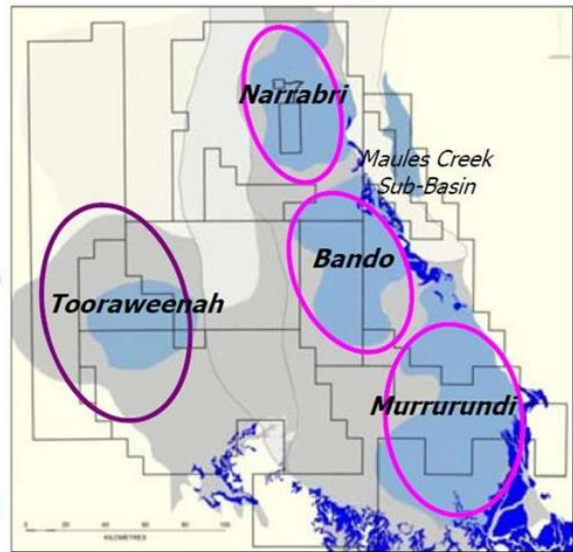
- Positive appraisal results
- First pilot commissioned – first gas after one week
- Targeting first 2P reserve bookings in 2012

## Murrurundi (PEL 456 & 452):

- High GIP due to very thick net coal (up to 90m)
- First lateral pilot well early 2012

## Tooraweenah (PEL 462 & 433):

- Exploration stage

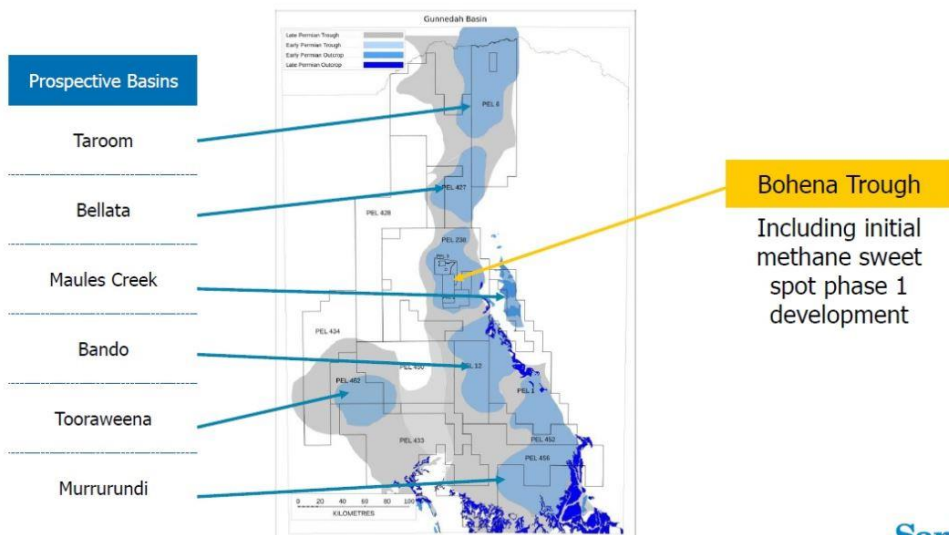


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Acreage with potential to underpin NSW Energy Supply

Santos acreage covers seven sub-basins across the Gunnedah Basin



67 | 2014 INVESTOR SEMINAR

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**Date:**

20 October 2017