FACT SHEET | November 2023

NARRABRI GAS PROJECT

DRILLING WITH CARE

Santos adopts the highest industry standards to ensure natural gas is produced safely and groundwater is protected.

The NSW code of practice for construction, operation and decommissioning of petroleum wells - was first issued in September 2021 with the most recent revision to the code of practice issued in May 2023. The code establishes a best practice framework for the design, construction, operation and maintenance of each well and has undergone peer review co-ordinated by the NSW Chief Scientist and Engineer.

Complying with the code of practice is a condition of our licence to explore and produce gas in the Project area. Some of the features we adopt to meet these standards include:

- All producing gas wells contain at least two layers of steel and cement
- These layers isolate the coal seams we are targeting from aquifers and other geologic formations including the Great Artesian Basin
- The steel pipe used in our wells is designed to withstand operational pressures during drilling operations, testing and production
- The cement used in our wells is laboratory tested and designed for the environment in which it is placed
- Once the cement is in place the casing is pressure tested to ensure well integrity
- We conduct regular monitoring and maintenance on all of our wells
- Routine operational visits are undertaken to test equipment and inspect the steel pipe
- Wells are also monitored remotely in real time and can be shut down manually or automatically in the unlikely event of a problem arising
- Once a well is no longer required, it is decommissioned
- Surface facilities are removed and the entire well is sealed with cement to ensure aquifers are protected, long after the well is decommissioned
- Rehabilitation of the site returns vegetation to its original state.

Lateral drilling

Lateral drilling will be an important part of the drilling program in the Narrabri area. Rather than drilling traditional vertical wells, Santos plans to drill vertically then steer horizontally or “laterally” along the coal seams.

The naturally occurring fractures in the coals around Narrabri are particularly suited to this safe and proven technology which is successfully used by Santos across its operations. Santos expects it will significantly improve the flow of gas to the surface by intersecting the coal in this way, eliminating the need for other technologies designed to promote gas flow, like hydraulic fracturing or “fracing”.

Lateral drilling has the added benefit of reducing the amount of surface disturbance and increasing the spacing between well pads, as laterals can be drilled underground in various directions from a central well pad, accessing more of the coal seams. With traditional vertical wells, a surface pad is required for each well and additional wells are generally needed to produce the same amount of gas.

Santos

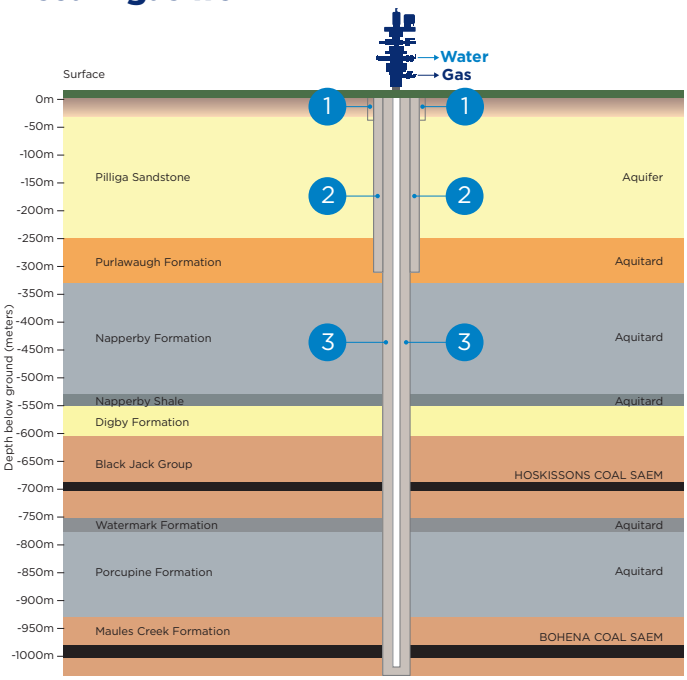
Santos wells are designed to:

- **Protect the environment, particularly underground sources of water**
- **Minimise the risk to personnel and the public**
- **Comply with the The NSW code of practice for construction, operation and decommissioning of petroleum wells**
- **Maximise the production life of the well**

How we drill a natural gas well:

- A 14 inch steel pipe, the conductor, is cemented 6-10 metres into the ground
- The conductor holds back the loose soil near the surface
- We drill through the conductor until we reach a geological rock layer through which substances, like water and gas, cannot easily pass. These layers are known as aquitards
- A second steel pipe, the 9-5/8 inch surface casing, is run to the bottom of the hole, into the rock layer and cemented to surface
- The surface casing is then pressure tested to ensure well integrity
- We drill through the surface casing a few metres and pressure test again ensuring the cement is bonded to the rock and steel
- Drilling continues down through the target coal seams and into the rock below
- A third steel pipe, the production casing, is run inside the surface casing
- This 7 inch production casing runs from the surface down into the coal seam and is cemented back to surface
- The well head is positioned on top of the well to allow production of natural gas and water.

Typical vertical Narrabri coal seam gas well



1 Steel conductor inserted and cemented into place

2 Surface casing inserted and cemented into place

2 Production casing inserted and cemented into place

Project Overview

The Narrabri Gas Project is committed to supplying 100 per cent of gas to the NSW domestic market, potentially supplying up to half of the natural gas used by NSW homes, small businesses, major industries and electricity generators every day.

Operations will be focussed on land in and around the Pilliga, near Narrabri.

The Project will create over 1,300 jobs during construction and bring significant economic benefits to Narrabri and the region, while delivering a cleaner, reliable source of energy to NSW.

Santos

Santos provides reliable, affordable energy for progress and seeks to provide lower carbon energy over time. Santos is a global energy company with operations across Australia, Papua New Guinea, Timor-Leste and the United States. For 70 years, Santos has been working in partnership with local communities, providing jobs and business opportunities, safely developing natural gas resources and from there powering industries and households.

santos.com