

Narrabri Gas Project (SSD 6456)

Santos response to questions on notice -
Independent Planning Commission

17 July 2020

IPC Question 1

Salt waste: provision of an overview of salt storage and beneficial reuse in the Queensland context and options for the Narrabri Gas Project

Salt storage and beneficial re-use in Queensland

There are no salt stockpiles in Queensland as a result of the coal seam gas industry. The three major coal seam gas projects in Queensland all have water treatment plants that use reverse osmosis technology to remove salt from produced water so that the water can be beneficially used for stock, irrigation, environmental flows or other purposes. The water treatment process produces a concentrated brine which is safely stored in engineered ponds to prevent any leakage into groundwater or the environment. Extensive and continuous leak detection, pond integrity and groundwater monitoring is in place. The ponds are regulated, licensed, monitored and audited by the Queensland Department of Environment and Science. The existing brine ponds are expected to have sufficient capacity to service the industry through to the cessation of currently forecast coal seam gas production. The average annual volume of salt removed from produced water by the coal seam gas industry in Queensland is around 244,000 tonnes (based on 25-year timeframe), which is about the amount of salt that the Sydney desalination plant (500 megalitres per day) would remove in five days. As a result of salt removal by the Queensland coal seam gas industry, around 40 gigalitres of high-quality water has been provided for beneficial use each year. This water is suitable for agriculture and environmental flows with more than 80 per cent used for irrigation.

Industry participants and the Queensland Government have conducted extensive studies into the feasibility of crystallising salt from brine and beneficially using it, however, the characteristics of the salt (which is predominantly sodium chloride, or table salt) make it of little commercial value. Sodium chloride is already in abundance, being cheaply and efficiently produced through evaporation of seawater. Feasibility of crystallisation and beneficial reuse will continue to be evaluated as technology and markets evolve.

Narrabri Gas Project salt and beneficial re-use

In 2019, Santos provided information regarding the chemical properties of the salt that will be removed from produced water at Narrabri and its potential for beneficial reuse. This can be found in Appendix C of the Report of the Water Expert Panel – Review of the Narrabri Gas Project:

The produced salt has high sodium carbonate / bicarbonate content with a high neutralising potential for the product. There is a range of industrial applications for sodium carbonate and sodium bicarbonate and currently no known domestic production of these products following the closure of Penrice Soda's Osbourne facility in South Australia. Additionally, the value of sodium bicarbonate / carbonate products is relatively high in comparison with that of common sodium chloride. On this basis, opportunities for the beneficial reuse of the salt product are being investigated. If a commercially viable market were found for the sodium bicarbonate then the proponent may consider making a further approval application for that process if one is required.

Potential beneficial uses of the sodium carbonate / bicarbonate include assisting to neutralise acid mine leachate in mine rehabilitation, manufacturing of glass, pulp and paper, soap and many other industrial products. Discussions with a NSW mine operator and relevant NSW government bodies are well advanced regarding potential field trials.

Recently, in an Australian first, Santos signed a Memorandum of Understanding with Natural Soda to use salt removed from produced water as part of the Narrabri Gas Project. Natural Soda produces pure, natural sodium bicarbonate at its facility in the Piceance Basin in Colorado, using energy efficient and environmentally friendly processes. Natural Soda is the second-largest producer in North America and its sodium bicarbonate is imported into Australia and around the world for use in a range of commercial products including food, pharmaceuticals, swimming pool chemicals, industrial chemicals and animal feed.

The two companies have been working together for over a year on a commercially-viable model that could create a new sodium bicarbonate industry for Narrabri and Australia, bringing more local jobs to the region. Sodium bicarbonate is commonly known as 'baking soda'.

Santos and Natural Soda plan to complete a concept study to inform an investment decision to produce sodium bicarbonate in Narrabri.

Regardless of the outcome, the water will still be able to be used for irrigation and the salt removed from the water can be disposed of in accordance with all waste management laws. Page xiv of the DPIE Assessment Report states *"the salt is likely to be classified as general solid waste which can routinely be disposed of at one of the 11 licenced waste facilities within 150 kilometres of the site."*

Prior to construction of the second phase of the project, Santos will provide a Produced Salt Beneficial Reuse and Disposal Study to the NSW Department of Planning, Industry and Environment for approval in accordance with recommended consent conditions.

IPC Question 2

Power: further details with respect to the power supply for the Narrabri Gas operations

Santos is still investigating the preferred power supply option for the project. A decision will be made following further engineering design and commercial negotiations, while addressing economic, ecological and emissions considerations to determine the best outcome for the project and NSW gas customers. The decision will take into account project development factors and strategic considerations such as optimising the volume of Narrabri gas available for sale to the domestic market, minimising Santos gas consumption consistent with practices in other Santos assets, benefits and impacts on the existing power network including required upgrades and optimising the energy mix powering the development including potential use of renewables consistent with our other assets. Santos expects to finalise the preferred power option for the project while completing the remaining appraisal works well in advance of development commencing.

From Chapter 6 of the EIS:

There are two options to provide power to the infrastructure at Leewood and Bibblewindi. They are:

- *connection to the NSW power grid. This option also includes the ability to draw power from the existing Wilga Park Power Station via a new power distribution line proposed for installation within the existing infrastructure corridor between Leewood and Wilga Park (refer Section 6.2.4)*
- *construction and operation of a gas-fired power generation facility on Leewood producing approximately 100 megawatts (MW) of electrical power.*

Under both options, power would be reticulated to Bibblewindi from Leewood via the Bibblewindi to Leewood infrastructure corridor (refer to Section 6.2.3). A schematic of the proposed (optional) power generation facility at Leewood is provided in Figure 6-10.

Both power options are assessed in this EIS. If constructed, the power generation facility would be located adjacent to the largest energy consumer on Leewood—the central gas processing facility (refer to Figure 6-7).

Required upgrades to the NSW electricity transmission network and associated infrastructure would be subject to a separate approval process.

IPC Question 3

Pipeline option: which pipeline option is preferred

Santos is still investigating the preferred gas pipeline option for the project, noting that all Narrabri gas will be sold and delivered into the domestic gas market. A decision will be made following further engineering design and commercial negotiations to determine the best outcome for the project and NSW gas customers. The decision will take into account considerations including but not limited to long-term supply security and supply competition for customers. Santos expects to finalise the preferred pipeline option for the project while completing the remaining appraisal works well in advance of development commencing.

In the east coast domestic gas market, domestic gas customers can contract pipeline transportation services for the gas they have purchased with a pipeline provider. Santos does not yet know what transportation arrangements gas customers will require and is exploring a number of domestic market options. Santos notes that, regardless of the pipeline option selected, gas will also be available for supply to the kinds of businesses that may want to establish locally in the Narrabri industrial area, with total gas supply from the project being enough for up to half the current NSW market. Narrabri industrial area customers will have a competitive advantage because of their proximity to the gas supply source as they will incur lower transportation costs than customers in Sydney or more distant regional areas.

Santos has a Project Development Agreement with the APA Group for a proposed pipeline running southwest from Narrabri to connect into the Moomba to Sydney pipeline.

The Hunter Gas Pipeline is a separate project from the Narrabri Gas Project. Santos is not a participant in the Hunter Gas Pipeline project, although the DPIE Assessment Report identifies that it is approved and therefore an option for the project.

Santos notes that any pipeline development will be subject to the NSW Government's regulatory requirements.

IPC Question 4

Domestic market provision: confirmation that Santos has committed to 100% provision of gas to the domestic market (by providing to the Commission a copy of the letter dated February 2020 from Santos to NSW Resources and Geoscience with respect to imposition of conditions to that effect on the relevant petroleum titles);

Please see the 12 February 2020 Santos letter to Resources and Geoscience at **Attachment 1**. The 30 June 2020 response from Resources and Geoscience to Santos is at **Attachment 2**.

IPC Question 5

Energy prices: confirmation that the proposed facility, with the committed supply of gas domestically, would have a downward effect on energy prices.

Mr Rod Sims, Chairman of the ACCC stated in a speech to the 2019 APPEA Oil and Gas Conference the importance of additional supply in the southern markets of NSW, SA and Victoria on price:

“The level of future domestic prices in the southern states will depend on the marginal source of supply in the southern states. Producing additional gas in the south is likely to result in much better pricing outcomes for domestic gas users than transporting gas from Queensland or importing it through an LNG import terminal.”

As highlighted by Mr Sims, when an additional source of supply is introduced into the gas market, it allows for the reallocation of gas molecules to other loads. For example, if gas from the NGP is economic to serve the Sydney market, it means that less gas is required to be transmitted to Sydney from Victorian fields or from South Australian and Queensland fields. The ACCC has found that customers in NSW and Victoria pay \$2 to \$4 more per gigajoule for gas simply because of gas transportation costs.

To this end ACIL Allen has modelled the effect of the NGP on gas prices in Sydney. The marginal cost of production of the NGP project is stated in AEMO documentation as \$6.40 per GJ. At this marginal cost, ACIL Allen’s gas market modelling shows that the NGP can compete effectively to supply gas to the NSW market post 2024, even with an LNG terminal operating at Port Kembla and at Crib Point in Victoria. As a result of the reallocation of gas supplies and the optimisation of the transmission network, the modelling shows that gas prices in Sydney would be between around 4 per cent and 12 per cent lower from 2025 onwards over the 25-year evaluation period with the NGP than without it. Furthermore, the NGP has the unique ability to place downward pressure on prices because it adds another source of supply close to the Sydney market at a time when additional contingent gas supplies are needed to meet market demand in the eastern Australian gas market.

IPC Question 6

Narrabri fertiliser plant: the anticipated gas demand for the Narrabri fertiliser plant

A non-binding agreement between Santos and Perdaman for the supply of up to 40 TJ per day or around 14.5PJ of natural gas per annum over 20 years was signed in February 2019. Subsequent to this, Santos signed a Heads of Agreement with Perdaman in August 2019 to assist with further study and the design of Perdaman’s proposed ammonia production facility at Narrabri.

Neither the impact of lower gas prices nor the presence of a fertiliser plant at Narrabri were taken into account in the economic modelling. When these factors are taken into account, the benefits in the economic modelling to the Moree-Narrabri region would have been noticeably higher, as would the economic benefits to the rest of NSW. For example, Perdaman advised the proposed fertiliser plant was expected to support an additional 700 jobs in the construction phase and sustain 100 direct and a further 100 indirect, ongoing jobs during operations.

ACIL Allen’s modelling indicates that, with significant local Narrabri gas demand, the project will still result in a reduction of wholesale gas prices in Sydney over the 25-year evaluation period, hence putting downward pressure on prices as well as contributing additional economic benefits.

IPC Question 7

Water model: the intended process for updating the water model while maintaining community transparency

The recommended condition B37 requires periodic groundwater model updates, and that updates are undertaken in consultation with the Water Technical Advisory Group (WTAG). In accordance with recommended condition B36, membership of the WTAG will include government, independent experts and local groundwater users and/or landholders. The NGP Community Consultative Committee (CCC) will also be regularly updated throughout groundwater model reviews.

Community members through the WTAG and CCC will participate in groundwater model reviews, supported and informed by the two independent expert members of the WTAG. The agendas and minutes of both the WTAG and CCC will also be publicly available.

IPC Question 8

Fugitive emissions: further details on the CO₂ content of the gas (pre-processing)

The EIS assessed an average of 10 per cent carbon dioxide over the 25-year assessment period, the operating life of the project.

Between 2014 and 2019 over 250 gas samples have been taken from approximately 32 operating appraisal wells. The average carbon dioxide content of the gas in these samples is much lower at less than five per cent.

Santos has set a long-term aspirational target of net-zero emissions from its operations by 2050 and a medium-term target of a 5 per cent reduction in emissions from its Queensland and South Australian operations by 2025, compared to 2018. Santos produces an annual climate change report consistent with the recommendations of the G20 Taskforce on Climate-related Financial Disclosures. Santos is investing in carbon capture and storage (CCS), which is a critical technology for the world to achieve its climate goals to limit global temperature increase to well below 2 degrees Celsius. Santos is currently proposing a CCS project at Moomba in South Australia. In addition, we are increasing our use of renewable energy and improving energy efficiency across our operations with recent projects to convert diesel pumps to solar on oil wells in SA, deliver solar power to our Port Bonython facility in SA, and install upgraded power generation at our Devil Creek facility in WA. In addition, Santos has nature-based emissions reduction projects approved under the Emissions Reduction Fund, including a world-leading savannah-burning project in the Northern Territory.

IPC Question 9

Extreme weather: provision of modelling with respect to extreme weather events and how that has influenced the design of the produced water storage ponds and salt stockpiles

In 2019, Santos confirmed the Environmental Containment Freeboard of the Leewood ponds, Appendix C of the Report of the Water Expert Panel – Review of the Narrabri Gas Project.

The ponds are designed with an Environmental Containment Freeboard (ECF) sufficient to provide storage for a 48 hour, 1:20,000 Average Recurrence Interval (ARI) event,

equivalent to 650 mm over 48 hours, or three 48-hour, 1:100 year ARI events. Thus, if ponds were at the Maximum Operating Water Level immediately prior to a 48-hour 650 mm rainfall event, levels will still be below the spillway following that event. This ECF significantly exceeds the requirements of the NSW Dam Safety Committee guidance. Only one 48-hour period across the 10,841 days of recorded rainfall at the Rosewood weather station has exceeded even 240 mm (maximum daily = 196 mm).

Figure 6-5 in the EIS shows the existing and proposed infrastructure at Leewood, including the proposed water treatment plant. Figure 6-9 provides the indicative layout of the proposed water treatment plant, incorporating a crystalliser and a covered interim storage facility for salt.

The EIS modelled and mapped the flood levels and depths for a 1 per cent annual exceedance probability (AEP) flood event over the project area.

The existing water treatment plant is bunded. The proposed water treatment plant would also be bunded and unaffected by the 1 per cent AEP flood event. Flood levels approximately 200mm greater than the 1 per cent AEP flood event would also be below the bunding. As the interim salt storage area will be covered, it should not be susceptible to adverse impact from extreme weather events.

IPC Question 10

Well pads: confirmation of the number of new well pads, the number of existing pads that will become production pads, and what will happen to the existing well pads that will no longer be used

Chapter 6 of the EIS Project Description states:

To commercially extract the gas within the project area, up to 850 new wells on a maximum of 425 new well pads would be developed. The 850 new wells would include new exploration, appraisal and production wells, though exclude existing or approved exploration and appraisal wells (refer to Table 2-1). The wells would be progressively commissioned and decommissioned within the project area. Exploration and appraisal wells may be converted to production wells depending on their gas yields.

Chapter 2 of the EIS Location and Setting states:

Table 2-1 lists the current and previous Santos exploration and appraisal approvals relevant to this project, including wells that would be utilised during the project if considered suitable for production. If converted, these wells would be additional to the 850 new wells under the project.

If wells are not suitable for conversion to production they would be decommissioned and the site rehabilitated in accordance with the NSW Code of Practice for Coal Seam Gas Well Integrity or converted to a monitoring bore. Similarly new appraisal wells will be assessed on a case by case basis.

Attachment 1 – Santos letter to Resources and Geoscience

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12 February, 2020

Mr Michael Wright
Deputy Secretary
Division of Resources and Geoscience
Department of Planning, Industry and Environment
PO Box K348
Haymarket NSW 1240

michael.wright@industry.nsw.gov.au

Dear Mr Wright

I am writing in relation to PEL 238 which is currently the subject of a renewal application lodged on 1 July 2016. Santos understands that the renewal application will not be determined until after a decision is made on the current development application for the Narrabri Gas Project, which falls wholly within PEL 238.

Santos has publicly committed that gas produced from the Narrabri Gas Project in PEL 238 would be sold into the domestic gas market and not to LNG export projects.

While it is unusual for retrospective conditions to be applied to petroleum titles, Santos proposes that in order to formalise this commitment, a condition be attached to the renewed licence requiring gas produced from PEL 238 to be sold into the domestic gas market. It is our view this would provide greater confidence to the community that Narrabri would be developed solely for the domestic gas market.

Please contact tracey.winters@santos.com or on 0439 991 730 if you require further information.

Yours sincerely



David Banks
Executive Vice President Onshore Upstream

Attachment 2 - Resources and Geoscience letter to Santos



IRF20/2958

Mr David Banks
Executive Vice President Onshore Upstream
Santos Ltd
GPO Box 2455
ADELAIDE SA 5001

By email: david.banks@santos.com
cc: tracey.winters@santos.com

30 June 2020

Dear Mr Banks

Thank you for your letter dated 12 February 2020 regarding proposed conditions to be imposed upon any renewal of Petroleum Exploration Licence (PEL) 238. I sincerely apologise for the delay in responding.

I note your request to consider adding a condition to PEL 238 to formalise your commitment to sell all gas from the Narrabri Gas Project into the domestic market.

Mining, Exploration and Geoscience (MEG) agrees in principle that such a condition could provide greater confidence to the community, depending on a number of factors. MEG is willing to consider an appropriate condition of this type, including, if recommended, in its capacity of advising the decision-maker for any applications in relation to relevant titles associated with the Narrabri Gas Project. However, this would only be on the basis that the project is granted development consent under the *Environmental Planning and Assessment Act 1979*.

I note that all applications for new petroleum titles and to renew existing petroleum titles must be assessed in accordance with the requirements outlined in the *Petroleum (Onshore) Act 1991* (the Act) before the decision-maker determines the applications. Also, if any grant or renewal of the title is recommended, the decision-maker must consider what appropriate title conditions should be imposed. Applications from the holder of a petroleum title to vary the conditions on that title are also assessed against the Act.

Thank you for bringing this proposal to my attention.

Yours sincerely,

A handwritten signature in black ink, appearing to read 'M Wright', is positioned above the typed name.

Michael Wright
Deputy Secretary
Mining, Exploration and Geoscience