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Steve O'Connor  
Panel Chair, Narrabri gas project  
by email: [ipcn@ipcn.nsw.gov.au](mailto:ipcn@ipcn.nsw.gov.au)

## RE: Unresolved problems with Narrabri gas project and assessment

Dear Mr O'Connor

We write to draw your attention to unresolved problems with the Narrabri gas project and its assessment. We appreciate the panel's efforts in making the public hearing accessible and in asking questions of the Department of Planning, its water expert panel and the EPA and other government agencies. However, it is not clear to us, with the public hearing and meetings over, how or if unresolved problems will be addressed in a methodical and satisfactory way.

We do not consider the answers and information provided to the IPC by the Department of Planning, NSW EPA and Water Expert Panel to be comprehensive or adequate. We note with confusion Professor Cook's statement during the meeting on 28 July that, "What we have is enough information to say that this is the stage to which the project can proceed. **And nobody is saying that that (sic) should proceed to 850 wells.**"

With respect, this is precisely what Santos is seeking a legal authority to do by applying for a development consent. Once that consent is granted, we are not aware of any mechanism for reconsideration of the project if assessment and project planning reveal unacceptable impacts. We take Professor Cook's advice to mean that there is insufficient confidence to proceed to 850 wells. The IPC cannot grant a development consent for this 850 well gasfield on such a basis.

We outline below in more detail some issues that require the IPC's attention:

1. **"Reasonable and feasible" caveats on conditions:** The EPA's advice on this issue has been contradictory, but it is reckless and unacceptable for crucial conditions like the groundwater model upgrade and beneficial re-use of salt to be left open to being not implemented if Santos and the Department deem them to be not reasonable or feasible.
2. **Uncertainty of groundwater impacts – scale of impact:** The Department and the Water Expert Panel appear convinced that there could be no potentially serious groundwater impacts, but this directly contradicts advice provided by the CSIRO and the Independent Expert Scientific Committee as outlined in the attached document. In reality, the modelling indicates the maximum flux from the Pilliga Sandstone could be equivalent of 5.9% of the long-term annual extraction limit of that water source, which is already over-allocated.
3. **Uncertainty of groundwater impacts: consideration of entitlements:** The groundwater model will be used to determine the level of take from the overlying productive aquifers, so its accuracy must be able to be relied upon. Uncertainty about when and if the groundwater model will be updated leaves the scale of entitlements Santos will be required to obtain from productive and over-allocated groundwater sources unknown.

4. **Undescribed impacts on Gunnedah Oxley Basin water users:** The Water Expert Panel and Department's assumption that there is no "regional scale" faulting has no bearing on the impact on these water users, since a localised fault could cause serious impact such as lost access to water. The Department's Assessment Report makes no mention of this group of affected Gunnedah Oxley Basin water users or the impact of the gasfield on them.
5. **Contamination risk:** The Department claims to be "struggling" to see where the risk of contamination arises. A review of the contamination events that have already occurred in the Pilliga as a result of coal seam gas exploration and a review of spills and leaks in the Queensland gasfields would assist them.
6. **Whether the Chief Scientist's recommendations affect assessment of this project:** It was asserted that the failure to implement the Chief Scientist's recommendations would not be a barrier to assessing this project. We would draw the panel's attention to the risk management tool of Recommendation 11, which was *supposed to be used to assess new projects*, and Recommendation 12, which would have established a Standing Expert Body that would have advised, inter alia, "on the implications of CSG impacts in NSW for planning where CSG activity is permitted to occur in the State." These and other recommendations on modelling and data collection would have reduced uncertainty and improved the assessment of this project. These recommendations were clear priorities for the NSW Chief Scientist back in 2014. In their absence, the IPC must refuse consent.
7. **Salt waste:** The answers to the IPC's questions provided by Carmen Dwyer and recorded in the transcript of the Commission's meeting on 28 July contradict to the EPA's previous recommendations on this issue, which listed it among the matters that needed to be resolved "prior to determination."
8. **No consideration of role of climate change in intensifying bushfire risk:** The IPC asked the Department on the 7th day of the public hearing whether its assessment had considered the increased likelihood of fire danger as a result of climate change. David Kitto's immediate answer to this was "yes" but the extended response that followed indicated this is not the case. Expert advice indicates that already-high 1 in 70 chance of a loss of containment of a fire caused by the gasfield may be increased 150% as a result of climate change.
9. **Contrary to climate change goals and policies:** Expert evidence provided by Professor Penny Sackett indicates that proceeding with the Narrabri Gas project would be contrary to NSW's commitment to net zero emissions and Australia's emission reduction commitments. The release of the *Integrated Systems Plan 2020* and failure of the Department to obtain independent advice about gas demand projections, consider demand-side measures or mention the NSW Government's emissions-reduction policy leaves major gaps in the information before the IPC. These omissions further erode the case for this project. The Department's Assessment does not even mention New South Wales' policy objective of reducing its greenhouse gas emissions by 35% on 2005 levels by 2030 or the Net Zero Plan which has a target of 10% hydrogen in the gas network.

We provide in the pages that follow detailed information to substantiate the problems above. Given that the Department has not yet provided responses to the IPC's requests for information, it may be necessary for us to make further submissions and correspondence after this information is made available to the public.

Sincerely

Georgina Woods

## ***Issues needing further attention***

### **1. Reasonableness and feasibility**

We note the Department's and the EPA's response to questions about the use of the phrase "reasonable and feasible" in the conditions of consent. Ms Dwyer's assertion that "all the conditions are enforceable" contradicts the EPA's previous advice that the phrase "reasonable and feasible," "involve[s] a degree of subjectivity which would require expert evidence to establish a breach." David Kitto noted in his explanation of "reasonable" that it involved a judgement about whether "the costs are justified." Information about costs of various mitigation measures is unknown. There is a definition of "reasonable" in the draft consent: "applying judgement in arriving at a decision, considering mitigation benefits, cost of mitigation versus benefits provided, community views and the nature and extent of potential improvements." The answer provided by David Kitto that "feasible is can it be done in an engineering sense" differs from the definition in the consent. The definition of "feasible" in the draft consent is "what is possible and *practical in the circumstances.*"

The panel may see this as an insignificant degree of nicety, but it goes to the heart of the acceptability of the project. Firstly, the IPC should be able to satisfy itself about whether or not mitigation actions are feasible prior to determination. Secondly, any mitigation actions deemed by Santos to be not reasonable or practical in the circumstances will not be undertaken and therefore, any requirement or condition which is modified by such language must be considered potentially not enforceable.

There are two crucial instances that should interest the IPC regarding this phase:

1. Beneficial reuse of salt waste is to be maximised only as far as "reasonable and feasible." Numerous comments have been made about the cost implications of beneficial reuse but no reliable estimate has been provided. The draft consent provides no confidence that any of the salt waste will be reused and it also provides no confidence that an environmentally robust disposal option will be found.
2. The groundwater model is to be upgraded to Class 2 or 3 confidence level only if "reasonable and feasible" *and* only in a timeframe that is "reasonable and feasible." (Condition B37 (e): The groundwater model update must "include all reasonable and feasible measures to improve the model to meet the requirements of a Class 2 and Class 3 confidence level model (as per the Australian Groundwater Modelling Guidelines) as soon as is reasonable and feasible.")

We previously noted in our submission that Santos has been pressed by Government agencies to upgrade the groundwater model for over six years. The language of Condition B37 (e) indicates that there is a reasonable likelihood that it will not be upgraded before Santos proceeds to full production of the gasfield. Since the volume of water entitlements Santos will acquire are determined by the model, this has real world ramifications: the gasfield may end up causing considerably more loss of water to overlying aquifers than the model predicts, with consequent impacts on water availability for other users who, in the absence of an accurate groundwater model, will have no way of attributing this impact to the gasfield.

### **2. Uncertainty of water impacts – scale of potential impacts**

Several people at the Water Expert Panel meeting used the phrase "fit for purpose" to describe Santos' groundwater model. Any use of this phrase must include clarification of the "purpose" for which the model is described as being fit. In this instance, the model is considered fit for describing *regional* scale groundwater impacts, but *not* for predicting impacts on landholders and groundwater

dependent ecosystems, nor for estimating the likely scale of water entitlements required. Professor Cook clarified this during the meeting, in elaborating on the phrase “fit for purpose”:

the purpose at the moment is to provide an overall plan for the Narrabri Gas Project. Do you we have the information that’s suitable for citing all 850 of the proposed wells? Well, of course not. Nothing like that. What we have is enough information to say that this is the stage to which the project can proceed. And nobody is saying that that should proceed to 850 wells.

Professor Cook appears to be saying that “the stage to which the project can proceed” is the initial Phase 1 of the project. But there will not be any avenue available to halt Phase 2 of the development from proceeding if it is found, after the model is calibrated and upgraded, that the scale and duration of impacts of the gasfield dewatering on other water users and on groundwater dependent ecosystems will be unacceptable.

David Kitto told the public hearing that “we certainly haven’t heard anyone explain what the serious environmental damage on the aquifer would be because, you know, that hasn’t come through in any of our assessment.” We would draw Mr Kitto and the panel’s attention to Dr Kevin Hayley’s evidence which cites work prepared by CSIRO and submitted by Santos in response to questions about the predictive uncertainty of the model. Dr Hayley notes in his evidence that predictions of changes in flux to the Great Artesian Basin Pilliga sandstone show a maximum change of 2,299 ML/yr at the 95th percentile and that this prediction is approximately 8% of the Long-Term Annual Extraction Limit from the Pilliga Sandstone of 29.68 GL/yr. We note that on 1 July 2020 a revised Water Sharing Plan for NSW GAB Groundwater Sources was gazetted with an increased LTAAEL for the Southern Recharge of 38.7GL per year. With this new limit, the maximum predicted flux as a result of the gasfield is 5.9% of the long-term annual extraction limit. Similarly, it is not clear if the Department or the Water Expert Panel have read the advice from the Independent Expert Scientific Committee which observed that uncertainties in the groundwater model “have the potential to result in a material impact in the context of the NSW Aquifer Interference Policy (AIP) as drawdown magnitude appears to be materially more important and uncertain than induced water flows.”<sup>1</sup> Professor Cook’s characterisation of a decrease in the water table of two or three metres as a “very minor impact” is at odds with the NSW Aquifer Interference Policy for which 2 metre draw down at any water supply work is deemed a “more than minimal impact.”

The uncertainty of the scale and nature of groundwater impact which has been identified by the Independent Expert Scientific Committee, DPIE Water, Dr Hayley and Prof Currell remains and represents too great a risk for the project to proceed.

### **3. Uncertainty of groundwater impacts: consideration of entitlements**

The groundwater model will be used to determine the level of take from the overlying productive aquifers, so its accuracy must be able to be relied upon. If the model produces inaccurate estimates of water loss from the GAB Southern Recharge and Namoi alluvial aquifer, which are not the actual leakage volumes, management rules can do nothing to account for or mitigate this. If the hydrological impact of the gasfield is equivalent to 8 per cent of water of the long-term annual extraction limit of the GAB Southern Recharge, as Hayley notes the CSIRO has considered possible (noting his comparison is based on the previous LTAAEL), this needs to be known before the impact is enabled by a legal instrument.

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<sup>1</sup> IESC Project Advice. Narrabri Gas Project EPBC 2014/7376  
<http://www.iesc.environment.gov.au/system/files/resources/1849e5a1-01ed-4673-b351-be94b1df1e88/files/iesc-advice-narrabri-2017-086.pdf>

On the issue of the Lower Namoi Alluvium discharge from the Pilliga Sandstone, it is stated by Michael Williams in the transcript of the Water Expert Panel meeting that, “There’s miles enough data there to be able to adequately assess that – assess what that flux is and predict what the impacts are going to be.” It is not clear, if this is true, why that data has not been used to resolve the uncertainty. Crucially, we note that proposed Condition B37, dealing with the upgrade of the groundwater model, requires “consideration of leakage from the GAB to the Lower Namoi Groundwater Source” but specifies that this be done “using the heads predicted by the EIS model.”

#### **4. Unknown impact on Gunnedah Oxley Basin water users**

We were disappointed that the IPC did not clarify with the Department and DPIE Water what impact the gasfield will have on Gunnedah Oxley Basin water users. These water users are more exposed to impacts than users of the shallow overlying aquifers as the formations from which they draw water are in closer proximity to the coal seam. The Water Expert Panel and the Department’s insistence that there is no “regional scale” faulting has no bearing on the impact of the gasfield on these water users, since a localised fault could cause considerable impact and cause them to lose access to water. The Department’s Assessment Report makes no mention of this group of affected water users or the impact of the gasfield on them.

#### **5. Contamination and spill risk**

The Department claims to be struggling to see where the risk of contamination arises. We would draw the Panel’s attention to incidents that have already taken place in the Pilliga as a result of much smaller scale coal seam gas activities. Professor Fells alluded to one of these incidents during the meeting on 28 July, but was dismissive about the vegetation death that it caused. He also made the statement that “There was no impact on the lower aquifers below” but as the information below demonstrates, there has already been aquifer contamination in the Pilliga.

In June 2011 Eastern Star Gas spilt 10,000L of produced coal seam gas water from the Bibblewindi Water Treatment Facility, but did not notify authorities. Between June 2011 and January 2012, local landholders and environment groups documented and attempted to raise evidence of land and water pollution, animal death and vegetation death in and around the Bibblewindi sites caused by leaking pond liners, surface water spills and discharge into Bohena Creek with Santos and various government agencies. Santos responded to media questions in January 2012 saying “not been any leaks at any of our sites.” In January 2012, the Government and Santos both publicly admitted to the surface water spill of 10,000 litres, of which only a third was recovered. That spill killed almost two hectares of vegetation and 9 years later is still being rehabilitated.

In May 2012, Santos informed the Government of a suspected leak from Bibblewindi Pond 3.<sup>2</sup> The EPA was informed nearly a year later, in March 2013, that groundwater sampling indicated elevated salinity and heavy metals in the shallow aquifers below.<sup>3</sup> The EPA did not inform the public and needed to ask Santos’ permission to send the information to the Department of Health. The EPA’s investigation reported that the shallow aquifers below the leaking pond had elevated levels of heavy metals, including uranium levels above the 2011 health guideline, in the worst instance, 20 times the health guideline. The then Office of Environment and Heritage reported that vegetation communities surrounding Pond 3 were likely to utilise the shallow alluvial groundwater.

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<sup>2</sup> Resources and Geosciences Division Q and A

[https://resourcesandgeoscience.nsw.gov.au/data/assets/pdf\\_file/0009/516492/FactSheet-Piliga.pdf](https://resourcesandgeoscience.nsw.gov.au/data/assets/pdf_file/0009/516492/FactSheet-Piliga.pdf)

<sup>3</sup> EPA investigation report.

[http://d3n8a8pro7vnmx.cloudfront.net/lockthegate/pages/1160/attachments/original/1399238109/Santos\\_Bibblewindi\\_Investigation\\_Report\\_-\\_Final\\_-\\_To\\_be\\_released.PDF?1399238109](http://d3n8a8pro7vnmx.cloudfront.net/lockthegate/pages/1160/attachments/original/1399238109/Santos_Bibblewindi_Investigation_Report_-_Final_-_To_be_released.PDF?1399238109)

This contamination event was not extensive, but it resulted in vegetation death and contamination of two shallow aquifers. It occurred as a result of much smaller scale activities than are now being proposed. The experience left the public with no confidence in the assurances of the Department that spills and will be proactively detected, reported and mitigated in a timely fashion. We note that these are not the only incidents that have occurred during CSG exploration in the Pilliga where there have also been leaks from the Tintfield ponds and from a produced water flow line, and that Santos has also been fined for produced water spills at its CSG operations in Queensland<sup>4</sup>.

## 6. Chief Scientist's recommendation not necessary prior to determination

Counsel Assisting the Commission, Richard Beasley, asserted that there are none of the outstanding Chief Scientist's recommendations "that had to be put in place before you could conduct a thorough assessment of this particular project." We respectfully suggest that the IPC review the findings of the parliamentary inquiry into this matter. We would particularly draw the IPC's attention to Recommendation 11, which was supposed to be used to assess new projects, and Recommendation 12, which would have established a Standing Expert Body that would have advised, inter alia, "on the implications of CSG impacts in NSW for planning where CSG activity is permitted to occur in the State."

Regarding insurance, we agree with Carmen Dwyer's statement during the meeting on 28 July that, "the whole idea here is that you actually identify the risks beforehand." This is precisely what has not been done to a degree that can satisfy the IPC.

Of the estimated cost of clean-up that the EPA claims it will ensure that Santos can pay for, Carmen Dwyer of the EPA told the IPC "we can't go through that process until we know whether something has been approved and what is actually approved." This is only the case because the approval that is being sought has not been described in the detail that would usually be required in these cases. This is unacceptable.

## 7. Salt waste

We appreciate the IPC seeking answers to questions raised by experts and the community regarding the destiny of over 800,000 tonnes of solid salt waste from the Narrabri gasfield. However, the answers to the IPC's questions provided by Carmen Dwyer and recorded in the transcript of the Commission's meeting on 28 July are contradictory to the EPA's previous recommendations on this issue.

The EPA's submission to the EIS dated 1 June 2017, requested Santos "identify the facilities where the salt waste is to be disposed and demonstrate capacity and capability of those facilities to handle the salt." This information was not provided, and in the EPA's advice on the Response to Submissions, dated 4 July 2018, the recommendation was reiterated, with the information described as being **necessary "prior to determination."** The EPA also remarked in its 2018 advice, "The EPA expects that many, if not all, landfill facilities in the local government area will not have the capacity to receive the quantity of salt (and other waste) generated by the project. Furthermore, sites with capacity may not be capable of managing that salt in an environmentally satisfactory manner because they may be un-lined or not have an operating leachate management system."

In answer to the IPC's questions about this issue on 28 July, Carmen Dwyer told the Commission that if there is no beneficial use available, "if it needed to go to a landfill, or a component of it, it could go to a solid waste landfill or higher landfills. There are a number of those across New South Wales." This answer may have given the IPC a false impression of the difficulty and pollution risk presented

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<sup>4</sup> Santos report this in its 2015 Sustainability Report. Reporting is inconsistent so up-to-date information is not possible.

by leaving this issue unresolved. In our view it contradicts the EPA's previous advice that Santos may experience difficulty finding an appropriately licenced facility. We note that under condition B65 and B66, neither the Waste Management Plan and Produced Salt Beneficial Reuse and Disposal Study are required to be developed prior to the commencement of Phase 1 of the development, which will further delay resolution of this issue.

#### **8. Department's assertion that it has considered increased likelihood of bushfire**

The IPC asked the Department on the seventh day of the public hearing whether its assessment had considered the increased likelihood of fire danger as a result of climate change. David Kitto's immediate answer to this was "yes" but the extended response that followed indicated this is not the case. Appendix E5 to the Assessment Report states that for this project "the likelihood of a loss of containment creating a fire is estimated at once in 70 years." This is already a substantial risk and amounts to a 35% chance there will be a loss of containment creating a fire during the life of the gasfield. However, there is no mention in this assessment of the change in fire risk as a result of increased heat from climate change over the next 25 years. According to Dr Karl Mallon, as detailed in our previous submission, there will be a 150% increase in the probability of bushfire conditions in the area local to the gasfield under IPCC's Representative Concentration Pathway 8.5, which is the current global emissions trajectory. Dr Mallon advises that, "This would have an impact on estimated bushfire ignition probability of 1 in 70 years notes in the document titled *Question to Santos - Email of 2 September 2019*, in principle raising the probability to 1 in 28 years – i.e. climate change could result in a reasonably high probability of the project starting a bushfire during its lifetime."

#### **9. Not consistent with climate change policies and goals**

The failure of the Department to obtain independent advice about future gas demand, consider demand-side measures or mention the NSW Government's emissions-reduction policy leaves major gaps in the information before the IPC and erodes the case for this project.

One of the key justifications of this project is the economic need for gas and the Department argues in its Assessment Report that the project is needed to "support the development of gas-fired power stations in NSW to provide dispatchable energy to the National Electricity Market (NEM) as it transitions away from a long-term reliance on coal-fired power stations to a greater reliance on renewable energy." This argument is based on false premises and flawed analysis. It is crucial that the IPC consider more reliable information rather than risking the environmental damage of this project on the basis of the Department's generalisations.

The Department's Assessment does not engage with the recently-released *Integrated Systems Plan 2020*, nor does it mention New South Wales' policy objective of reducing its greenhouse gas emissions by 35% on 2005 levels by 2030 or Stage 1 of the state's *Net Zero Plan* which has a target of replacing 10% of the gas in the gas network with hydrogen. Furthermore, the *NSW Energy Savings Scheme – Draft Statutory Review Report* (April 2020) recognises that "gas efficiency is important to reducing gas emissions" (14) and the most recent *Energy Security Target and Safeguard: Consultation Paper* cites preliminary analysis conducted for the Department of Planning in 2019 that indicates there are opportunities to 11 petajoules (PJ) of gas each year.<sup>5</sup>

In the week between day 6 and day 7 of the IPC's public hearing, the Australian Energy Market Operator released its long-awaited *Integrated Systems Plan 2020*, outlining a plan to secure energy supplies and reliability during the transition away from coal-fired power stations. This document does not foresee increased use of gas in the electricity market over the next decade and considers

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<sup>5</sup> Energy Security Target and Safeguard: Consultation Paper 2020.  
<https://energy.nsw.gov.au/media/2031/download>

the role of gas in the electricity market beyond 2030 as almost entirely dependent on price, with the additional consideration of “future climate policies.”

The *ISP 2020* makes clear that gas is not necessary to achieve reliability:

GPG [Gas-powered generation] and batteries can both serve the daily peaking role that will be needed as VRE [variable renewable energy] replaces coal-fired generation, so relative whole of life cost is a key variable for potential investors to consider. GPG has a cost advantage over batteries at current gas and battery costs. However, in the 2030s when significant investment in new dispatchable capacity is needed, this advantage could shift to batteries, especially to provide dispatchable supply during 2- and 4-hour periods. Based on the cost assumptions in the *ISP*, new batteries are more cost-effective than GPG in the 2030s. Future climate policies may also impact the investment case for new GPG. (Page 55).

There is considerable uncertainty in the above paragraph, and unknown factors that will have bearing on the direction we take, but the implications are clear: contrary to the Department’s generalisations, we do not need to support the development of gas-fired power stations in New South Wales. Proceeding down this path, approving the Narrabri gas project and supporting gas-fired electricity rather than electricity options that have far lower greenhouse intensity is not consistent with the IPC’s responsibility to ensure greenhouse gas emissions are minimised to the greatest extent. The reference above to “current costs” for gas needs clarification. AEMO’s *ISP 2020* goes on to specify that “for GPG to remain a competitive investment as battery costs reduce (to \$922/kW by 2030), **gas prices need to be as low as \$4/GJ in the long run**, while charging costs need to remain relatively high at \$30/MWh.” We note that Santos has certainly not put forward that it could ever achieve a gas price as low as \$4/GL from the Narrabri Gas Project.

Expert evidence provided by Professor Penny Sackett, former Chief Scientist of Australia, indicates that proceeding with the Narrabri Gas project would be contrary to NSW’s commitment to net zero emissions and Australia’s emission reduction commitments. Professor Penny Sackett’s advice considers the Narrabri gas project and the daunting mitigation task to achieve the Paris climate agreement goals from multiple angles. Her advice also clearly demonstrates the unacceptable damage that would be wrought by failing to meet these goals. We do not argue of course that refusing the Narrabri gas project will prevent these impacts, but granting it consent will make it harder to achieve them. In the words of Prof Sackett: “The Narrabri Gas Project substantially works against achieving Australian and NSW 2030 emission reduction targets” and that it “will make meeting Australian and New South Wales 2030 emissions targets considerably more difficult.”

The starkness of her evidence cannot be ignored by the Commission, “At current rates, Australia’s and NSW’s notional 2°C emission budgets may be expended in 1.5–9 years (Australia), and 2–12 years (NSW), before or just after 2030. This time scale will be shortened by the approval of the Narrabri Gas Project.” Prof Sackett has calculated NSW’s share of the remaining carbon budget to keep global average temperatures below 2 degrees and has estimated that the greenhouse emissions created by the Narrabri gasfield over its life would account for 11% total remaining NSW 2°C carbon budget.