DOC20/20457

Mr Steve O'Donoghue
Director Resource Assessments
NSW Department of Planning, Industry and Environment
GPO Box 39
Sydney NSW 2001

Dear Mr O'Donoghue

I refer to the NSW Department of Planning, Industry and Environment's (DPIE) – Planning Assessments Group email of 16 October 2019 to the NSW Environment Protection Authority (EPA) regarding the Santos' Narrabri Gas Project's revised draft Conditions of Consent. I also refer to the EPA's prior correspondence regarding salt disposal and fugitive emissions for the project.

Draft Conditions of Consent

The EPA has reviewed the revised draft consent conditions and notes the additional updates that have been made in response to EPA comments provided on 26 September 2019. Please find enclosed **Attachment A**, which provides further detailed comments regarding the revised draft conditions with recommended consent revisions and additions for your consideration.

If the project is approved, it is essential that all conditions and post consent management plans are enforceable and consistent across approval instruments to ensure that the EPA, as lead regulator for gas activities in NSW, can take appropriate regulatory action if non-compliances are identified.

Salt disposal and fugitive emissions

I note that Santos has provided DPIE with additional information, and made commitments regarding the disposal of salt waste generated by the project, and that this information was supplied to the EPA on 31 October 2019. Following the review of the additional information, the EPA is now satisfied that matters previously raised during the assessment phase regarding salt disposal have been adequately addressed.

I also note that during December 2019 Santos provided additional information directly to the EPA relating to fugitive emissions. While the additional information provided has helped to broadly evaluate the risk of fugitive emissions, the EPA is still unable to fully advise on fugitive emission risk and mitigation for the project without further information. **Attachment B** provides detailed comments regarding fugitive emissions, along with a suggested proposal outlining the information required to enable the EPA to complete a risk assessment and provide relevant advice on the matter.

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The EPA welcomes the opportunity to discuss the attached information with DPIE – Planning and Assessments Group. If you have any questions, or you would like to discuss the EPA's advice, please contact Mr Andrew Cowan on 02 9995 6941 or email Andrew.Cowan@epa.nsw.gov.au

Yours sincerely

12 FEB 2020

Richard Bean
Interim Chief Executive Officer
Environment Protection Authority

Enclosure

Attachment	Title
A	Comments on the draft Consent Conditions 16Oct19
B	Detailed comments fugitive emissions

Attachment A – comments on the draft Conditions of Consent 16Oct19

Information reviewed

- SSD 6456 Draft Conditions of Consent 16 Oct 2019.doc

Relevant Proposed Consent Condition(s) for Narrabri Gas Project	**EPA Response**
Definitions	The EPA request that the definition of "Produced Water" in the conditions read as per the *Exploration Code of Practice: Produced Water Management, Storage and Transfer* (DPE, 2017) As such, the EPA request that the definition of "Produced Water" reads (additions underlined): *"Any form of groundwater that is actively extracted from a borehole, petroleum well or excavation, excluding incidental groundwater mixed with drilling fluids";*
13 Noise Operating Conditions	The EPA requests the following amendments to proposed consent condition B13 Noise Operating Conditions for clarity (suggested additions are underlined): ***Noise Operating Conditions*** *B13. The Applicant must:* ... *(e)... regularly assess meteorological and noise monitoring data, and modify operations in the project area in response to this data, to ensure compliance with the relevant conditions of this consent.*
B23 (under Air Quality Criteria)	The EPA requests the following amendments to the proposed consent condition B23 Air Quality Criteria because the modelling and assessment document referred to does not stipulate the sampling test methods required for the air emissions from the development to be measured in accordance with (suggested additions are underlined and deletions ~~struckthrough~~): ***Air Quality Criteria*** *B23. Air emissions generated by the development must be measured in accordance with the relevant requirements and exemptions of the ~~Approved Methods for Modelling and Assessment of Air Pollutants in New South Wales (EPA, 2016)~~ Approved Methods for the Sampling and Analysis of Air Pollutants in NSW (DEC, 2007).*

A24 Protection of Public Infrastructure	The EPA recommends that the consent condition be amended to require that all works must be done to the satisfaction of the applicable authority for enforceability. As such, the EPA request that the condition be amended to read (additions underlined): ***Protection of Public Infrastructure*** *A24. Unless the Applicant and the applicable authority agree otherwise, the applicant must, to the satisfaction of the applicable authority:* *(a) ....* The EPA also suggest consideration be given to clearly defining who the applicable authority will be. For example, is it meant to be the public authority that owns or manages the public infrastructure, or regulates it where a private entity provides the infrastructure.
B26 Air Quality Management Plan	The EPA requests the following provisions be deleted from proposed consent condition B26 as they are redundant in the context of other conditions (suggested additions underlined and deletions ~~struckthrough~~): ***Air Quality Management Plan*** *B26. The Applicant must prepare an Air Quality Management Plan for the development to the satisfaction of the Planning Secretary. This plan must:* *...* *(e) ...; and* ~~*(f) include predicted air quality concentrations for all potential pollutants at representative sensitive receiver locations, and adjacent the Leewood facility, based on additional air quality assessment and modelling; and*~~ ~~*(g)*~~*(f) include an air quality monitoring program that:* *(i) evaluates and reports on:* • *the effectiveness of the air quality management system;* • *compliance against the air quality criteria in this consent;* • ~~*compliance with air quality impact assessment criteria in the Approved Methods for Modelling and Assessment of Air Pollutants in New South Wales (EPA, 2016), for other relevant pollutants (including air toxics);*~~ *...*
B42(d)(v) Produced Water Management Plan	The EPA requests that proposed consent condition B42(d)(v) is amended to include the additional points to the second and third bullet points of this condition as set out below (underlined). The EPA's suggested amendments reflect water balance matters it previously raised regarding the Narrabri Gas Project. The suggested amendments also reflect conditions the EPA has required (and monitor) for similar proposals and are considered key elements for both managing the water balance and sustainably managing Produced Water for the Narrabri Gas Project:

	Water Management Plan *B42. ...* ... *(v)* ***Produced Water Management Plan****, that includes:* ... • *a detailed description of the produced water management system, including details of:* - *produced water collection, transfer, storage, treatment, beneficial usage and/or disposal infrastructure;* - *clear identification of access to sufficient irrigation area and offsite storage, and clear processes and milestones to sustainably irrigate effluent in the lead up to peak water production, during peak water production, and for the remaining years of water production;* - *fail-safe and redundancy measures;* - ... • *detailed performance criteria, including trigger levels for identifying and investigating any potentially adverse impacts associated with:* - *produced water yield and quality;* - *treated water yield and quality;* - *use of produced water storages as upstream storage for excess irrigation or discharge;* - *ceasing produced water production if water is more than all available management options;* ...
B42(d)(iii) Surface Water Management Plan	The EPA requests that proposed consent condition B42(d)(iii) Surface Water Management Plan be amended as follows to help ensure the safety of the community and the environment, as well as for compliance purposes (additions underlined): 1. Under dot point 1 (baseline data), insert the following new sub-point: - *identification of downstream water uses and downstream environmental values;* and 2. Under dot point 4 (performance criteria), insert the following new sub-point: - *downstream surface water flows and water quality for downstream environmental values including homestead water use, stock watering, irrigation, recreation and aquatic ecosystems.*
B42(d)(viii) Managed Release Protocol	The EPA requests the addition of the following bullet points to proposed consent condition B42(d)(viii) regarding Managed Release Protocol. The EPA's suggested additions reflect matters previously raised regarding the monitoring location for the managed release trigger at Bohena Creek, the discharge point being located upstream, and matters

	regarding information on water discharges generally to assist the EPA with its role as lead regulator for Gas in NSW (suggested additions underlined and deletion ~~struckthrough~~): ***Water Management Plan*** *B42. ...* *...* *(viii)* ***Managed Release Protocol*** *for managing disposal of treated water to Bohena Creek, that includes:* *...* • *details of predicted plume dispersal for all potential pollutants, based on ~~updated~~ mixing zone assessment and modelling;* • *the location of a downstream monitoring point close to the edge of the modelled near-field mixing zone;* • *the flow gauging station for the measurement of treated water discharges to Bohena Creek and justification for its location;* • *a protocol and detailed procedures for the managed release of treated water, including the triggers for commencing and stopping discharge(s) to Bohena Creek, in accordance with the water management performance measures in Table 6;* • *measures to:...*
B73(c)(iv) Produced Salt Beneficial Reuse and Disposal Study	The EPA notes proposed condition B73(c)(iv) refers to the Produced Salt Beneficial Reuse and Disposal Study including a demonstration that "appropriately licenced waste facilities are able to accept the volume and composition of salt waste produced by the development". However, this does not recognise that councils, as the owners of many of such facilities in the relevant area, are able to refuse receipt of that waste based on reasons such as having sufficient capacity to deal with current waste levels from existing ratepayers. Also, some facilities can lawfully operate without a licence. The EPA therefore suggests the following amendments to condition B73(c)(iv) to account for these matters (suggested additions are underlined and deletions ~~struckthrough~~): ***Produced Salt Beneficial Reuse and Disposal Study*** *B73 The Applicant must undertake a Produced Salt Beneficial Reuse and Disposal Study, to the satisfaction of the Planning Secretary. The study must:* *...* *(c) include:* *...* *(iv) a strategy for disposal of any produced salt that is not able to be beneficially reused, including demonstration that an occupier of a waste facility can lawfully accept, ~~appropriately licenced waste facilities~~ ~~are able to~~*

<table>
<tr><td></td><td><s>accept</s> and will permit, the volume and composition of salt waste produced by the development for disposal at their premises.</td></tr>
<tr><td>B78 Final Hazards Study</td><td>EPA request the following amendments to B78 cl (e) for consistency (suggested additions are underlined and deletions <s>struckthrough</s>):

HAZARDS AND RISK
Final Hazard Studies
B78. ...
...
(e) Pipeline Safety Management Study, prepared in accordance with the <s>Australian Standard AS 2885 - 2007, Pipelines - Gas and liquid petroleum.</s> Australian Standard AS 2885.1, Pipelines – Gas and liquid petroleum (Part 1: Design and construction). The study must be prepared in consultation with all relevant stakeholders including, but not limited to, the pipeline operator.</td></tr>
<tr><td>Appendix 7 Treated Water Quality</td><td>The EPA requests that the reference to “139mg/L” in Appendix 7 of the draft consent conditions regarding total alkalinity for Treated Water and Amended Water be replaced with a reference to “100mg/L”. The relevant row of the table in Appendix 7 would therefore read (suggested additions underlined and deletions <s>struckthrough</s>):

Appendix 7 Treated Water Quality

<table>
<tr><td>Parameter</td><td>Australian Drinking Water Guidelines (NHMRC 2011)</td><td>ANZECC/ ARMCANZ (2000) Irrigation Guidelines (Short term < 20 years)</td><td>ANZECC/ ARMCANZ (2000) Stock watering</td><td>Treated Water</td><td>Amended Water</td></tr>
<tr><td>...</td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td>Alkalinity (total as $CaCO_3$)</td><td>Not referenced</td><td>Not referenced</td><td>Not referenced</td><td><s>139</s> 100</td><td><s>139</s> 100</td></tr>
</table>

Additionally, the EPA notes that Appendix 7 references the short-term <20 years ANZECC / ARMCANZ (2000) Irrigation Guidelines. EPA recommends that consideration is given as to whether the long-term >20 years ANZECC /</td></tr>
</table>

ARMCANZ (2000) Irrigation Guidelines may be more appropriate in reflecting the project lifespan. The EPA suggests that the relevant row of the table in Appendix 7 be amended to the following (suggested additions underlined and deletions ~~struckthrough~~):

Parameter	*Australian Drinking Water Guidelines (NHMRC 2011)*	*ANZECC/ ARMCANZ (2000) Irrigation Guidelines (~~Short~~ Long term ~~<~~ > 20 years)*	*ANZECC/ ARMCANZ (2000) Stock watering*	*Treated Water*	*Amended Water*
...					
Aluminium	*Health: Not referenced* *Aesthetics: 2*	*~~20~~* *5*	*5*	*<0.001*	*<0.001*
Manganese	*0.5*	*~~10~~* *0.2*	*Not sufficiently toxic*	*<0.001*	*<0.001*
Iron	*<1*	*~~10~~* *0.2*	*Not sufficiently toxic*	*<0.001*	*<0.001*
Cobalt	*Not referenced*	*~~0.1~~* *0.05*	*1*	*<0.001*	*<0.001*
Nickel	*0.02*	*~~2~~* *0.2*	*1*	*<0.001*	*<0.001*
Copper	*2*	*~~5~~* *0.2*	*0.4 (sheep)* *1 (cattle)* *5 (pigs)*	*<0.001*	*<0.001*
Zinc	*Health: Not referenced* *Aesthetic: 3*	*~~5~~* *2*	*20*	<0.001	<0.001
Arsenic	*0.01*	*~~2~~* 0.1	*0.5 - 5*	*<0.001*	*<0.001*
Selenium	*0.01*	*~~0.05~~* *0.02*	*0.02*	*<0.001*	*<0.001*
Molybdenum	*0.05*	*~~0.05~~* *0.01*	*0.15*	*<0.001*	*<0.001*
Cadmium	*0.002*	*~~0.05~~*	*0.01*	*<0.001*	*<0.001*

	0.01				
Lead	*0.017*	*~~5~~ 2*	*0.1*	*<0.001*	*<0.001*
Uranium	*0.017*	*~~0.1~~ 0.01*	*0.2*	*<0.0028*	*<0.0028*
Total N	*Not referenced*	*~~25 – 125~~ 5*	*Not referenced*	*0.005*	*0.005*
Fluoride	*0.5*	*~~2~~ 1*	*~~Not referenced~~ 2 (1 if livestock feed contains fluoride)*	*0.08*	*0.08*
Total Phosphorous	*Not referenced*	*~~Crop specific – (0.8 – 12)~~ 0.05*,*	*Not referenced*	*0.01*	*0.01*

Notes:
All criteria are in mg/L unless stated
* To minimise blocking of irrigation equipment only

New Condition – Air Quality Verification Assessment

The EPA has previously requested that Santos prepare and submit an Air Quality Verification Assessment addressing specific issues. The EPA requests that this is added as an additional condition of consent (suggested additions are underlined):

Air Quality Verification Assessment

Prior to construction of Phase 2 of the project, the Applicant must prepare an Air Quality Verification Assessment for the development to the satisfaction of the NSW EPA and the Planning Secretary. This must include:

1. *A detailed description of all processing plant including but not limited to gas processing and treatment systems including the glycol dehydration, compression engines and power generation facilities;*
2. *Demonstrate that all plant design and emission performances will ensure best practice emission performance*
3. *Include dispersion modelling conducted in accordance with the Approved Methods for Modelling and Assessment of Air Pollutants in NSW (EPA, 2017), that is based on final plant design, engineering parameters and emission performances. The Verification Assessment must present both predicted incremental and cumulative ground level concentrations.*
4. *Demonstrate that final plant design will comply with applicable prescribed concentrations contained in the Protection of the Environment Operations (Clean Air) Regulation 2010*
   Note: The reference to this Regulation is a reference to the regulation as in force or as remade from time to time.

	5. *Nominate emission limits for point sources that:* a. *Are consistent with proper and efficient operation of plant and equipment* b. *Protect the health and amenity of the surrounding community*
New Condition - Gas Well Integrity	The EPA suggests that an additional condition be added to the consent conditions regarding the standards for the gas gathering infrastructure. The EPA suggests the following condition (suggested additions are underlined): ***Gas and water gathering lines*** *All aspects of the gas and water gathering lines, including their commissioning, design, construction, testing, operation and decommissioning, must comply with:* *(a) AS/NZS 4130:2018 Polyethylene (PE) Pipes for Pressure Application, or any other relevant Australian Standard* *(b) the Code of Practice for Upstream Polyethylene Gathering Networks - CSG Industry (Australian Pipelines and Gas Association, 2019).*
General comment – enforceability of conditions	The EPA notes that a number of conditions use phrases such as "all reasonable and feasible measures". This phrase, and others such as "as soon as practicable", "to the greatest extent practicable" or "as soon as reasonably practicable" involve a degree of subjectivity which would require expert evidence to establish a breach, noting that evidence could be refuted by any expert called for the other party. To increase the enforceability of such provisions, the EPA recommends that measurable/quantifiable measures or methods be described or referenced.

Attachment B – Detailed comments fugitive emissions

The EPA previously recommended that prior to project determination the proponent should provide a robust and transparent review of information to inform the risk of fugitive emissions for trace VOCs and air toxics. While Santos provided some additional information to the EPA in December 2019, further information is required to evaluate project specific air toxics emissions, assess the quantum of emissions and risk based on the scale and design of the proposed project, or confirm the adequacy of the emission mitigation based on project specific information.

As a result, the EPA is not able to fully advise on adequacy of emission control measures for managing risks (and post mitigation residual risks) associated with fugitive emissions from the proposed development without further information.

To assist with finalising this issue and to ensure the risks of fugitive emissions for trace VOCs and air toxics are managed, the EPA suggests the following be provided:

1. Analytical results for a minimum of 5 samples of project specific gas composition for trace VOCs/air toxics.
    a. Sample collection and analysis should be broadly consistent with USEPA TO-15 methods
    b. Results for all compounds must be expressed in ppm/vol and/or mg/m^3
    c. Results for all samples must have a sufficiently practical quantification limit or limit of reporting which enables defensible evaluation of potential for air quality impacts from fugitive emissions of the substances which present the most significant risk of impact.
2. Quantification of potential (and expected) fugitive emissions of trace VOCs/air toxics
    a. Quantification may be derived based on (but not limited to) expected quantum of coal seam gas fugitive emission and relative amount of VOC/air toxic derived in 1 (above).
3. Based on 1 and 2 (above), defensible and transparent evaluation of the potential for air quality impacts from fugitive VOC and air toxic emission from project infrastructure under peak and/or worst-case project operations.
4. Based on 1, 2 and 3 (above), defensible and transparent evaluation and justification that the proposed mitigation measures, including but not limited to the leak detection and repair program adequately:
    a. minimise the potential for fugitive emissions of air toxics/trace VOCs from all gas infrastructure.
    b. manage potential impacts from residual emissions.

The EPA has reviewed and commented on DPIE's revised draft conditions of approval relevant to air quality on the basis that:

- The required information will be provided prior to project determination.
- The additional information, when provided, adequately and robustly demonstrates that the risk of impact from fugitive air toxics is low and can be adequately managed via proposed mitigation measures to be implemented by the project – e.g. the proposed leak detection and repair program.

The EPA doesn't anticipate significant issues associated with fugitive emissions of air toxics from a project of this nature with the implementation of best practice systems, processes and mitigation measures, coupled with rigorous design standards and governance programs. However, specific gas compositional analytical results are required to determine whether this is possible. Noting the additional time that may be required to provide the

information above, the EPA can provide DPIE with additional advice upon the provision of the analytical results proposed in point 1 above, while the remaining information is forthcoming.