

Approval notice and statement of reasons

Petroleum (Environment) Regulations 2016 (NT) (Regulations)

Interest Holder	Santos QNT Pty Ltd (Santos) ABN 33 0830 771 96
Petroleum interest/s	EP161
Environment management plan (EMP) title	McArthur Basin 2019-2020 Hydraulic Fracturing Program
EMP document reference	Revision 4 prepared by Santos QNT Pty Ltd dated 14 October 2019
DENR EMP assessment document reference	NTEPA2019/0102-007~0011
Regulated activity	Hydraulic fracturing and appraisal of three wells
Is the EMP a new plan submitted under reg 6 or a revision of a current plan submitted in accordance with reg 15?	New plan
Was the regulated activity referred ¹ for consideration whether an environmental impact statement or public environmental report was required?	Yes, in accordance with the <i>Environmental Assessment Act 1982</i>
Was an environmental impact statement or public environmental report required?	No NT EPA decision of 15 October 2019 NTEPA2019/0102-003~0001
Has an Authority Certificate under the <i>Northern Territory Aboriginal Sacred Sites Act 1984 (NT) (NTASSA)</i> been issued for the regulated activity?	Yes Authority Certificates C2019/043 NTEPA2019/0102-004~0003
Date an EMP compliant with reg 8 was first submitted under reg 6	27 August 2019
Dates within which the EMP was published for comment under reg 8A, if applicable	30 August to 27 September 2019
Date further information was required and submitted under reg 10, if applicable	2 October 2019
Date of resubmission notice under reg 11(2)(b), if applicable	N/A
Date EMP was resubmitted under reg 11(3), if applicable	N/A
Date a notice setting out a proposed timetable for consideration of the EMP was issued under reg 11(2A) if applicable	N/A
Proposed timetable given in notice under reg 11(2A) if applicable	N/A
Where provided under s29B of the <i>Northern Territory Environment Protection Authority Act 2012 (NT) (NT EPA Act)</i> , the dates the Northern Territory Environment Protection Authority (NT EPA) was requested to, and provided, advice on EMP	Date of Minister's request for advice: 25 February 2019 Date of NT EPA Advice: 15 October 2019 NTEPA2019/0102-002~0002

¹ This means a referral under the *Environmental Assessment Act 1982 (NT)* or the *Environment Protection and Biodiversity Conservation Act 1994 (Cth) (EPBC Act)*.

Date of decision

22/10/2019

Decision maker



Signature

Hon Eva Dina Lawler MLA, Minister for
Environment and Natural Resources

1 Approval notice

1. The EMP is approved.

reg 11(2)(a)

2. The approval is subject to the following conditions:

reg 12(2)

Condition 1: The Interest Holder must submit to the Department of Environment and Natural Resources (DENR), an updated timetable for the regulated activity prior to the commencement of the activity and provide an updated timetable to the DENR each month, including progressive rehabilitation works. The timetable must include dates for the implementation of commitments, development of key documents and associated hold points.

Condition 2: The Interest Holder must provide to DENR:

- i. results of ongoing groundwater monitoring in accordance with the Code of Practice: Onshore Petroleum Activities in the Northern Territory (the Code) and the Preliminary Guideline: Groundwater Monitoring Bores for Exploration Petroleum Wells in the Beetaloo Sub-basin every quarter for three years from the approval date of the EMP for publishing on the DENR website, to inform the development of site-specific performance standards for groundwater quality
- ii. notification of any results above the inter-quartile range of all monitored parameters in groundwater that occur at Inacumba and Tanumbirini well site within five days of receipt of laboratory report analyses.

Condition 3: The Interest Holder must provide to DENR, within 60 days of flowback commencing, a report on the risk assessment of flowback wastewater from the hydraulic fracturing phase. The risk assessment must be:

- I. prepared by a suitably qualified person²
- II. prepared in accordance with the monitoring wastewater chemistry analytes specified in Section C.3 of the Code of Practice: Onshore Petroleum Activities in the Northern Territory

² Defined in the Code as: A person who has professional qualifications, training or skills or experience relevant to the nominated subject matters or tasks and can give authoritative assessment, advice and analysis about performance relevant to the subject matters using relevant protocols, standards, methods or literature or conduct tasks in accordance with requirements.

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Condition 4: The Interest Holder must store flowback wastewater from hydraulic fracturing only in enclosed tanks during the wet season³, until otherwise advised in writing by DENR.

Condition 5: In addition to the methane leak detection requirements of Section D.5.2 and Table 10 of the Code, the Interest Holder must also undertake leak detection and reporting (LDAR) within seven days of commissioning the well.

Condition 6: In the event of any accidental release (overflow, failure, spill or leak), to ground of flowback water that exceeds 200 litres, the Interest Holder must provide a written report to DENR within 24 hours after the incident was detected⁴. The report must include:

- I. details of the incident specifying material facts, actions taken to avoid or mitigate environmental harm
- II. the corrective actions taken including the volume and depth of impacted soil removed for appropriate disposal if required
- III. any corrective actions proposed to be taken to prevent recurrence of an incident of a similar nature.

Condition 7: The Interest Holder must provide to DENR a soil contamination assessment report of the tank pad and well pad area that includes a comparison to the baseline soil assessment for all monitoring points and parameters undertaken at each well site. The report must be:

- I. submitted to DENR within six months of removal of flowback water from the wellsite(s)
- II. prepared by a suitably qualified person².

Condition 8: The Interest Holder must provide to DENR a fortnightly updated look-ahead weather forecast for risk of onset of wet weather and high bushfire danger for the duration of the regulated activity.

³ Wet season defined in the Code of Practice: Onshore Petroleum Activities in the Northern Territory as the months October to April inclusive.

⁴ Note that this requirement applies in addition to the obligations of in addition to any relevant requirements of Part 3, Division 1 of the Petroleum (Environment) Regulations 2016

2 Material considered

1. The following material has been taken into account in making this decision:
 - a. Santos QNT Pty Ltd McArthur Basin 2019 -2020 Hydraulic Fracturing Program EP161 Revision 4 dated 14 October 2019
 - b. The principles of ecologically sustainable development set out in reg 4 and the approval criteria
 - c. The NT EPA decision and Statement of Reasons under the *Environmental Assessment Act 1982* relating to the regulated activity not requiring assessment.
 - d. The NT EPA advice provided at my request under s29B of the NT EPA Act.
 - e. The Authority Certificate issued under the *Northern Territory Aboriginal Sacred Sites Act 1989* and associated response provided by the Aboriginal Areas Protection Authority.
 - f. The Code of Practice: Onshore Petroleum Activities in the Northern Territory (Code) as set out in reg 4A.
 - g. All public comments submitted under reg 8B.

3 Statement of reasons

1. The EMP meets the approval criterion in reg 9(1)(a), because it contains all the information required by Schedule 1 of the Regulations. reg 9(1)(a)
2. The EMP meets the approval criterion in reg 9(1)(b) for the following reasons: reg 9(1)(b)
 - a. The nature of the regulated activity is as follows:

The program occurs at two well site locations, Tanumbirini and Inacumba on EP 161, and includes the following exploration well activities: mobilisation of rig and hydraulic fracture materials to each well site, hydraulic fracturing preparation activities including pressure testing and cement bond logging, cased hole Diagnostic Fracture Injection Test (DFIT), installation of passive seismic monitoring surface array and tiltmeters at both well sites, vertical seismic profile (VSP) and microseismic monitoring at Tanumbirini, hydraulic fracture of each exploration well in the Velkerri formation, pressure monitoring, placement of chemical tracers, completion and flowback from each exploration well, storage and evaporation of flowback wastewater in tanks at each well site, extended production tests (EPT) including flaring of each exploration well, routine maintenance and monitoring activities, transport of wastewater from each well site to an authorised disposal facility, removal of tanks and other equipment and material from each well site, progressive stabilisation and rehabilitation of land disturbance areas, minor ancillary works associated with the above activities and well suspension or decommissioning of each exploration well.
 - b. The scale of the regulated activity is as follows:
 - i. The exploration program involves hydraulic fracturing of three petroleum wells.
 - ii. For the proposed horizontal exploration wells (one at Tanumbirini and one at Inacumba) fracturing will be in a series of 15 – 25 stages for a duration of approximately one month per well.

- iii. In the case of the Tanumburini-1 vertical well, hydraulic fracturing will target a series of 5 vertical stages.
- iv. This regulated activity will use an estimated total of 40 +/- 5 megalitres (ML) of groundwater sourced from existing bores at each well site.
- v. Each well will be flow tested for an initial EPT period of approximately 90 days and up to 12 months.
- vi. The total volume of flowback water from hydraulic fracturing required for offsite disposal is approximately 3.6 ML at each well site.
- vii. The Interest Holder has estimated approximately 130,000 tonnes carbon dioxide equivalent (CO₂-e) greenhouse gas (GHG) emissions from the regulated activity.

- c. The EMP contains an appropriate level of detail for the nature and scale of the activities proposed. The regulated activity is clearly described. The description of the existing sub-surface environment and aquifers is informed by adequate hydrological, seismic and stratigraphic studies and is adequately understood. The identification of environmental impacts and risks is comprehensive and contains a sufficient level of detail to inform assessment. The EMP provides detail on environmental outcomes and performance standards, implementation strategy, personnel, emergency contingency plan, stakeholder engagement, legislative requirements, recording, monitoring, reporting and notifications to an appropriate level of quality and applicability.
- d. Having regard to the above, the information in the EMP is appropriate for the nature and scale of the regulated activity to which it relates.

3. The EMP meets the approval criterion in reg 9(1)(c) for the following reasons:

reg 9(1)(c)

- a. I have considered reg 4(d) (which requires that I give fundamental consideration to the conservation of biological diversity and ecological integrity as follows:
 - i. I believe the information I have regarding the existing biodiversity and ecosystems that are to be affected by the regulated activity; the effects that are likely; and the mitigation measures reasonably available, is sufficient.
 - ii. The regulated activity poses a low risk to the ecosystem within the Sturt Plateau and Gulf Fall and Uplands bioregions. Given the relatively small area of impact, and the very large area of similar habitat within the region, the regulated activity does not pose a significant risk to any regional populations of threatened species. This EMP does not address land clearing or other civil works which have already been approved via a separate EMP (Santos McArthur Basin Civil and Seismic Program EP161 EMP). Four threatened species have been identified as having a 'medium' likelihood of occurrence within the regulated activity area. Due to the management strategies outlined in the EMP and the relatively small area of impact, it is unlikely that the regulated activity will pose a risk to the identified threatened species. Impacts and risks to flora, fauna, and ecosystems have been mitigated to an acceptable level.
 - iii. The conservation of biological diversity and ecological integrity is vital to the achievement of ecologically sustainable development. Given the fundamental nature of this consideration, I have given central importance to the conservation of biodiversity and ecological integrity in weighing whether I am satisfied the approval criterion in reg 9(1)(c) has been met.

- iv. If carried out in accordance with the EMP, the regulated activity is not considered to have an impact on the conservation of biological diversity. The EMP outlines measures to minimise impacts on affected environmental values, including maintaining groundwater quality, and where possible preventing interactions of fauna with wastewater storages. The potential impacts and risks of the hydraulic fracturing activities identified in the EMP relate to animal welfare and do not pose a significant risk to threatened species at a population level due to the low likelihood of threatened species inhabiting the area and implementation of control measures to avoid impacts to fauna. The EMP outlines measures to minimise impacts on fauna, including control measures to prevent interactions of fauna and stock with wastewater storages.
 - v. Where relevant, management measures are consistent with the requirements of the Code, and the Preliminary Guideline: Groundwater Monitoring Bores for Exploration Petroleum Wells in the Beetaloo Sub-basin.
 - vi. If carried out in accordance with the EMP, the regulated activity is not considered to have an impact on the conservation of ecological integrity.
- b. I have considered reg 4(a) (which concerns the integration of long-term and short-term economic, environmental, social and equitable considerations) as follows:
- i. The expression *environment* as defined in the *Petroleum Act 1984* relevantly includes the well-being of humans, structures made or modified by humans, amenity values of an area and economic, social and cultural conditions. The requirements under the Regulations include stakeholder engagement and a broad consideration of the environmental impacts and environmental risks of the regulated activity in question. In making that broad consideration, the long-term and short-term environmental impacts and environmental risks were identified and assessed in the EMP.
 - ii. The regulated activity is low impact and of short duration (up to 12 months for EPT). It forms one component of a broader gas exploration program in the region. The EMP adequately assesses the environmental impacts and risks associated with the regulated activity and outlines appropriate avoidance and mitigation measures. This includes the assessment and management of social impacts and risks, including the appropriate management of cultural heritage. An Authority Certificate under the *Northern Territory Aboriginal Sacred Sites Act 1989* has been issued for the regulated activity. The Interest Holder has undertaken stakeholder engagement with landholders and land managers, traditional owners, the Northern Land Council (NLC) and NT Government agencies, in accordance with regulations 7 and 9 of the Regulations.
 - iii. The regulated activity has considered environmental controls in hydraulic fracturing that ensures well integrity and long term protection of aquifers. These controls are appropriately identified in Table 3-10 of the EMP and will be documented in the Well Operations Management Plan for approval and oversight by the Department of Primary Industry and Resources.
 - iv. The regulated activity has considered controls in flaring arrangements to minimise bushfire risks and impacts to surrounding landholders.
 - v. The EMP has assessed the cumulative quantities of groundwater extraction from this regulated activity (~85ML) and the approved Drilling EMP (~12ML) and Civils and Seismic EMP (~45ML). The Interest Holder is

permitted to extract up to 193.5ML/year for five years under its water extraction licence granted under the *Water Act 1992* on 8 May 2019 (Licence No. GRF10280). The water entitlement takes into account the requirements for related exploration activities on EP 161 including the availability of water in the area, existing and likely future demand for water and any adverse effects likely to be created as a result of activities on other entitled users. The granted water extraction licence is less than 0.01% of estimated sustainable yield (ESY) range of the Gum Ridge aquifer. Any changes to water requirements other than what has currently been authorised under the *Water Act 1992* would also need to demonstrate compliance with these criteria.

vi. The EMP in this case is considered to have adequately assessed and integrated economic, social and environmental considerations.

vii. I observe that in carrying out the regulated activity there is no particular contest between economic, social and environmental considerations that requires further mention.

viii. Accordingly, I am satisfied that the concept of integration has been taken into account.

c. I have considered reg 4(b) (which concerns the 'precautionary principle') as follows:

i. The regulated activity does not pose a threat of serious or irreversible environmental damage which warrants the application of the precautionary principle.

d. I have considered reg 4(c) (which concerns the principle of intergenerational equity) as follows:

i. The environmental burdens of the regulated activity will not disproportionately affect particular stakeholders. Total cumulative GHG emissions for the approved activities in the Santos 2019-20 exploration program on EP 161 are estimated to be ~144,000 tCO₂-e, assuming a worst case EPT period of 12 months. The total estimated GHG emissions for the Santos 2019-20 exploration program will likely result in an overall increase in NT GHG emissions of 0.9%, noting that this is largely incurred as a result of the EPT which accounts for approximately 90% of total GHG emissions in the Santos 2019-20 exploration program on EP 161 and is only required in the exploration phase.

ii. Cumulative impacts of groundwater extraction have been assessed and will be regulated by a water extraction licence under the *Water Act 1992*.

iii. Cultural values relating to sacred sites will be protected through the application of Authority Certificates issued to the Interest Holder under the *Northern Territory Aboriginal Sacred Sites Act 1989* and measures for reporting on discovery of archaeological sites. Accordingly I do not believe that the carrying out of the regulated activity in accordance with the EMP would have an effect contrary to the principle of intergenerational equity.

e. I have considered reg 4(e) (which concerns the promotion of improved valuation, pricing and incentive mechanisms) as follows:

In accordance with the 'polluter pays principle':

(1) The Interest Holder will cover the cost of remediation of the impacts of the regulated activity, as is set out in Section 7.3 of the EMP.

- (2) If the Interest Holder fails to remediate the impacts, an environmental rehabilitation bond has been provided by the Interest Holder which is considered to be adequate to cover the resulting costs.
- f. No environmental report or statement has been required to be prepared in relation to the regulated activity. The NT EPA was not of the opinion that the regulated activity is capable of having a significant effect on the environment. reg 9(2)(b)
- g. The NT EPA has provided the following in relation to the regulated activity and the EMP:
- i. In accordance with my request under s29B of the NT EPA Act, the NT EPA reviewed the EMP for the regulated activity against the approval criteria in regulations 9(1)(b), 9(1)(c) and 9(2)(a) of the Regulations and other matters the NT EPA considered relevant, and has provided advice about the EMP. Relevantly:
- (1) The NT EPA recommended that should the EMP be approved, it be subject to ten conditions. The NT EPA's recommendations have informed the conditions of this approval. Eight of these conditions are outlined in section 1 (2) of this Approval Notice. I have not accepted the condition recommended by the NT EPA requiring daily on-site reports and activity forecasts because reporting commitments in the EMP and the requirements of Regulation 37 will require the Interest Holder to provide these reports. I have not accepted the condition relating to a specific rehabilitation program as I have incorporated the requirement to provide monthly updates on progressive rehabilitation works in condition 1 and rehabilitation commitments have been incorporated in the EMP.
- (2) The NT EPA concluded that the EMP for the regulated activity, subject to the recommended approval conditions, is appropriate for the nature and scale of the regulated activity and demonstrates that the regulated activity can be carried out in a manner that environmental impacts and environmental risks of the activity will be reduced to a level that is as low as reasonably practical and acceptable.
- ii. I have considered the NT EPA's advice and recommendations and these have been incorporated where relevant into the comments in this statement of reasons and the conditions in the Approval Notice.
- h. The existing environment along with its particular values and sensitivities is appropriately identified in Section 4 of the EMP. reg 9(1)(c)
- i. The anticipated environmental risks are appropriately identified in Section 5 of the EMP.
- j. I agree with the risk assessment set out in Section 6 of the EMP, and to the extent I do not agree, I have imposed conditions to address the relevant risk or risks.
- k. The Interest Holder has provided a risk assessment for operating during the wet season in the EMP and the outcomes are reflected in an emergency contingency plan, spill management plan and wastewater management plan. This is consistent with the requirements of the Code that allows for regulated activities to occur in the wet season months when contingency planning is provided and minimum freeboard in wastewater infrastructure is maintained. As a further precautionary measure, I have imposed a condition that all flowback wastewater is stored only in enclosed tanks during the wet season.

- i. The anticipated environmental impacts are appropriately identified in Section 6 of the EMP. The regulated activity is the third component of an exploration program and cumulative effects have been identified and assessed. In EMPs for subsequent stages (if they proceed) the Interest Holder will need to continue to address cumulative effects.
- m. The EMP demonstrates how the Interest Holder will comply with relevant requirements of the Code in undertaking this regulated activity. This includes a list of applicable ISO/API standards that have been adopted for the selection of materials for use in well construction; hydraulic fracturing program environmental controls and related engineering controls contained in the Well Operations Management Plan (WOMP); a summary of which is provided in the EMP. The risk assessment provided in the EMP cross references relevant sections of the Code that apply to the mitigation and management measures to enable the reviewer to identify and confirm that the proposed hydraulic fracturing program activities comply with the Code. The EMP provides a Chemical Risk Assessment, Wastewater Management Plan, Spill Management Plan and Methane Emissions Monitoring Plan, Fire Management Plan, specific petroleum well integrity criteria and monitoring programs that meet the requirements of the Code.
- n. I am satisfied that the Interest Holder has conducted stakeholder engagement in accordance with the Regulations. The EMP provides details of stakeholder engagement that meets Regulation 7 and Schedule 1, Clause 9 of the Regulations (Section 9 and Appendix I). Stakeholder engagement records (Table I-1, Appendix I) demonstrate that stakeholders did not raise objections about environmental impacts of the proposed activity that required specific changes from the Interest Holder. The EMP provides details of written feedback and input from stakeholders as part of the stakeholder engagement records. The risk assessment in the EMP details the potential environmental impacts of the activity and proposed environmental outcomes to manage impacts on social and cultural surroundings. The Interest Holder commits to notifying relevant stakeholders prior to undertaking of activity and operations in consideration of stakeholder's rights and to prevent disturbance to pastoral/landholder activities. The relevant stakeholder provided confirmation that a mutually satisfactory Land Access and Compensation Agreement (LACA) was reached in good faith and was satisfied that environmental outcomes and ongoing pastoral activities were considered and dealt with in the LACA.
- o. Ten public submissions were received by DENR, five from community members and five from non-government organisations. The majority of submissions were from within the Northern Territory. Frequent comments raised in the public submissions related to GHG emissions and climate change, chemicals and human health, groundwater extraction and contamination, wastewater, animal welfare and adequacy of stakeholder engagement. The specific technical issues of concern raised in the public submissions have been addressed in the NT EPA Advice which I have considered.
- p. Key issues raised in the 10 public submissions, NTG agencies and NT EPA Onshore Gas Committee were addressed by the Interest Holder via an updated EMP, including an updated Risk Assessment, GHG emissions estimate, Spill Management Plan, Fire Management Plan and Stakeholder Engagement details.
- q. I have taken into account all public submissions in making my decision. I recognise the importance the community places on the protection of water, human health management of chemicals and waste, stakeholder engagement, social impacts and regulation and compliance. The final EMP appropriately

identifies the risks and potential impacts raised in public submissions and commits to mitigation and management measures to address these risks and potential impacts.

- r. I note that the 10 submissions expressed opposition to the unconventional shale gas industry. I refer to the findings of the Final Report of the Scientific Inquiry into Hydraulic Fracturing in the Northern Territory that concluded the risks of onshore gas development could be managed and minimised to an acceptable level with the implementation of its 135 recommendations. All of the recommendations applicable to exploration approvals have been implemented.
- s. I am satisfied that the concerns and issues raised have been adequately mitigated and/or addressed in this EMP.
- t. There are no environmental impacts or environmental risks relating to the proposed regulated activity which I consider to be unacceptable.
- u. Overall, having regard to the above, I am satisfied that the EMP demonstrates that the regulated activity is to be carried out in manner by which the environmental impacts and environmental risks are reduced to a level that is:
 - i. as low as reasonably practicable; and
 - ii. acceptable