

## Approval notice and statement of reasons

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

Interest holder	Origin Energy Limited ABN 42 105 431 525
Petroleum interest/s	EP117
Environment management plan (EMP) title	Beetaloo Basin 2019-24 Drilling, Stimulation and Well Testing Program, Kyalla EP117 N2
EMP document reference	Document number: NT-2050-15-MP-025 Revision 1 prepared by Origin Energy Limited dated 5 August 2019
DENR EMP assessment document reference	NTEPA2019/0033-003~0007
Regulated activity	Drilling, hydraulic fracture stimulation and well testing of one well EP117 N2-1 and ancillary activities
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 <sup>1</sup> for consideration whether an environmental impact statement or public environmental report was required?	Yes, in accordance with the Environmental Assessment Act 1982
Was an environmental impact statement or public environmental report required?	No NT EPA decision of 7 August 2019 NTEPA2019/0042-003~0003
Has an Authority Certificate under the <i>Northern Territory Aboriginal Sacred Sites Act 1984</i> (NT) (NTASSA) been issued for the regulated activity?	Yes Authority Certificates C2019/039 NTEPA2019/0042-007~0036
Date an EMP compliant with reg 8 was first submitted under reg 6	1 May 2019
Dates within which the EMP was published for comment under reg 8A, if applicable	3 May 2019 to 30 May 2019
Date further information was required and submitted under reg 10, if applicable	Date required 1 August 2019; date submitted 5 August 2019 NTEPA2019/0042-003~0010
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	25 July 2019 NTEPA2019/0042-001~0003
Proposed timetable given in notice under reg 11(2A) if applicable	Decision under regulation 11 by 15 August 2019
Where provided under s29B of the <i>Northern Territory Environment Protection Authority Act 2012</i> (NT) (NT EPA Act), the dates the Northern	Date of Minister's request for advice: 25 February 2019 Date of NT EPA Advice: 7 August 2019

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

Territory Environment Protection Authority (NT EPA) was requested to, and provided, advice on EMP

NTEPA2019/0042-002~0001

Date of decision

/3 / 08 /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 provide a report to the Department of Environment and Natural Resources (DENR) where there is a non-compliance of an approval condition within 48 hours of becoming aware of the non-compliance.

**Condition 2:** The Interest Holder must submit to DENR, an updated timetable for the regulated activity prior to the commencement of the activity and provide an updated timetable to DENR each month. The timetable must include dates for the implementation of commitments, development of key documents and associated hold points.

**Condition 3:** The Interest Holder must provide to DENR a cementing report for the steel conductor casing through the aquifers as soon as practicable but not more than seven days after completion of the cementing job for the Kyalla exploration well EP117 N2-1.

**Condition 4:** The Interest Holder must provide to DENR:

- i. results of ongoing groundwater monitoring in accordance with the Code of Practice: Onshore Petroleum Activity 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 in the inter-quartile range of monitored parameters in groundwater above the natural distribution of values that occur at the Kyalla well site within five days of discovery
- iii. results of monitoring and reporting on the characterisation and analysis of flowback fluid in accordance with the Code, within one month of commencement of flowback for publishing on the DENR onshore petroleum webpage.

**Condition 5:** The Interest Holder must provide to DENR a report on the assessment and leachability testing of drill cuttings and drilling mud including the final disposal options, within three months of completion of the drilling program.

**Condition 6:** The Interest Holder must develop in consultation with DENR a rehabilitation plan for each disturbed areas appropriate to the nature and scale of the activity, in accordance with the requirements in the Code, no later than 3 months after



## 1 Approval notice

commencement of the activity. The Interest Holder must undertake progressive rehabilitation of the disturbed land in accordance with the plan, to provide an environment similar to original condition and uses.

**Condition 7:** The Interest Holder in addition to standard NGER reporting requirements, must provide to the DENR a mass balance of actual greenhouse gas emissions that incorporates flare efficiency and by-pass calculations, including emissions directly vented as methane within six months of completion of well testing activities.

**Condition 8:** The Interest Holder must provide to DENR an analysis of offsite disposal and beneficial use options, other than flaring, for liquid hydrocarbons if the combustion of liquid hydrocarbons at the flare exceeds an average of 5000 litres per day during the first month or following months of flaring.

## 2 Material considered

1. The following material has been taken into account in making this decision:
  - a. Origin Beetaloo Basin 2019-24 Drilling, Stimulation and Well Testing Program, Kyalla EP117 N2 EMP, Revision 1, dated 5 August 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 Northern Territory Environment Protection Act 2012.
  - 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:
    - i. Drilling, hydraulic fracture stimulation, well testing, completion and workover maintenance, suspension and/or plugging and decommissioning of a horizontal petroleum exploration well within the 2019 - 2024 period.
    - ii. All ancillary activities required to undertake the exploration activities, including construction and operation of a temporary camp, installation of up to two water extraction bores, routine maintenance and monitoring activities, minor ancillary works associated with the above activities
    - iii. The program occurs at one well location (N2-1) on the Kyalla EP117 N2 lease pad/site.
  - b. The scale of the regulated activity is as follows:
    - i. The drilling program involves drilling one well (N2-1) at the Kyalla EP117 N2; a vertical pilot well to the basement Formation, with a total vertical depth (TVD) of approximately 2,000 m and a deviated (horizontal section) bore hole towards the north-east from the vertical pilot hole kick off point for a total length of the wellbore measured along the actual well path, or Measured Depth (MD) of approximately 3,000 m.
    - ii. This regulated activity will use an estimated total of 38 megalitres (ML) of groundwater sourced from existing bores.
    - iii. The interest holder has estimated approximately 76,500 tonnes of carbon dioxide equivalent (tCO<sub>2</sub>-e) greenhouse gas emissions from the regulated activity, assuming a worst case well testing period of 12 months.



- c. The EMP contains an appropriate level of detail for the nature and scale of the activities proposed. The regulated activity is clearly described in the EMP. 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 bioregion. Given the relatively small area of impact (6.6 ha), 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 (Origin Beetaloo Basin Civil Construction EP117 N2 EMP, approved 6 June 2019). Three threatened species were 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. The potential impacts and risks of the drilling, hydraulic fracture stimulation and well testing activities identified in the EMP that relate to animal welfare, 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 mitigation measures to prevent interactions of fauna and stock with open cuttings pit or open water storage.
    - v. Where relevant, management measures are consistent with the requirements of the Code, NT Land Clearing Guidelines 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 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 Aboriginal Sacred Sites Act 1984 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 the provisions outlined in regulations 7 and 9 of the Regulations and section 41(6) of the Aboriginal Land Rights (Northern Territory) Act 1976.
  - iii. The regulated activity has considered environmental controls in well design, operations and decommissioning that ensures well integrity and long term protection of aquifers. These controls and site specific well integrity monitoring are appropriately identified in Appendix S of the revised EMP and will be further detailed in the Well Operations Management Plan for approval and oversight by the Department of Primary Industry and Resources.
  - iv. The EMP has assessed the cumulative quantities of groundwater extraction from this regulated activity (38ML) and the approved civils EMP (58 ML). The total volume of groundwater to be extracted is within the volume of groundwater the interest holder is permitted to extract under its water extraction licence granted under the Water Act 1992 on 8 May 2019 (Licence No. GRF10285). This extraction licence has a Maximum Water Entitlement of 175 ML/year for three years. The water entitlement takes into account the requirements for related exploration activities on EP117 including civil works, camp requirements, petroleum well construction and hydraulic fracture stimulation. The granted water extraction licence is less than 0.01% of cumulative current groundwater extraction from the Gum Ridge Formation aquifer.
  - v. The EMP is considered to have adequately assessed and integrated economic, social and environmental considerations.
  - vi. I observe that in carrying out the regulated activity there is no particular contest between economic, social and environmental considerations that requires further mention.
  - vii. 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. The cumulative greenhouse gas emissions estimate from the regulated activity and previously approved civils construction activities are approximately 77,000 t CO<sub>2</sub>-e. This represents 0.47% of annual Northern Territory emissions and 0.01% of annual Australian emissions reported for 2017. I consider the cumulative greenhouse gas emissions to be minimal in context of Northern Territory and Australian emissions.
  - 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 will be protected through the application of Authority Certificates issued to the interest holder under the Northern Territory Aboriginal Sacred Sites Act 1984 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:
  - i. 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 3.24 of the EMP.
    - (2) If the interest holder fails to remediate the impacts, an environmental rehabilitation bond will be 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 Petroleum (Environment) Regulations 2016 (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 seven conditions. The NT EPA's recommendations have informed the conditions of this approval.
    - (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. The content of the NT EPA's advice and recommendations have been incorporated 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 6 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 a condition or conditions to address the relevant risk or risks.
- k. The anticipated environmental impacts are appropriately identified in Section 6 of the EMP. The regulated activity is part of the second 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.
- l. The EMP demonstrates how the interest holder will comply with relevant requirements of the Code in undertaking the 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; drilling and hydraulic fracture simulation environmental controls and related engineering controls contained in the Well Operations Management Plan (WOMP); a brief summary of which was 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 drilling program activities comply with the Code. The EMP provides a Wastewater Management Plan, Spill Management Plan, Erosion and Sediment Control Plan, Bushfire Management Plan, Emergency Response Plan, Methane Emission Management Plan, Weed Management Plan, Chemical Risk Assessment, and specific petroleum well integrity criteria and monitoring programs that meet the requirements of the Code.
- m. DENR received 6,311 public submissions, comprising 6,284 submissions (form email letters) via internet campaigns and 27 submissions via the advertised Departmental public engagement modes. NT submissions represent approximately 4% of the total number of submissions received. Interstate submissions represent approximately 74% of the total number of submissions received with the majority originating from NSW and Victoria. A total of 12 submissions were received from overseas, including Germany (1), Canada (1), New Zealand (2), France (1) and the USA (7). Key issues raised in the 6,311 public submissions and comments from NTG agencies and the NT EPA Onshore Gas Committee were addressed by the interest holder via an updated EMP, including an updated Erosion and Sediment Control Plan and additional fauna welfare mitigation measures such as installation of a remote camera survey around the perimeter of the lease pad area.
- n. I have taken into account any public submissions in making my decision. I note the proportion (%) of issues raised in public submissions were relatively evenly spread across the following broad range of environmental and regulatory issues:

Social and cultural (14.2%)	<ul style="list-style-type: none"> <li>adequacy of stakeholder engagement with neighbouring and downstream landholders, potentially affected business operators, affected Aboriginal communities</li> </ul>
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	<ul style="list-style-type: none"> <li>• lack of social licence in the NT for onshore shale oil and gas fracking</li> <li>• worker health during times of high seasonal temperatures</li> <li>• impacts to public and tourism from increased traffic</li> </ul>
Flora and fauna (environment) (13.8%)	<p>Animal welfare</p> <ul style="list-style-type: none"> <li>• fauna entrapment in sumps/tanks or ingestion of contaminated water/materials collected during drilling and hydraulic fracture stimulation</li> <li>• deleterious impacts of land and/or water contamination on fauna in general, and threatened species – e.g. Gouldian Finch, species of Varanid and migratory birds known to frequent the region – i.e. Lake Woods</li> <li>• spread of weeds, feral pests (e.g. cane toads due to accessibility to wastewater tanks) and fire</li> </ul> <p>Baseline studies</p> <ul style="list-style-type: none"> <li>• lack of comprehensive environmental baseline studies to demonstrate the level of impact that may be incurred by development of the onshore gas industry, including consideration of impacts to groundwater dependent ecosystems</li> </ul> <p>Habitat degradation</p> <ul style="list-style-type: none"> <li>• increase in the spread of weeds; seeking commitment to eradicate declared and non-declared weeds introduced by this activity</li> <li>• increased bushfires exacerbated by gas flaring or other sources</li> <li>• loss and/or fragmentation of habitat for wildlife and livestock</li> <li>• small areas of land clearing will contribute to the ongoing modification of the native vegetation of the Beetaloo Basin</li> </ul>
Water (13.4%)	<p>Surface water</p> <ul style="list-style-type: none"> <li>• potential impacts to downstream wetlands (e.g. Lake Woods) from spills and/or loss of containment, particularly during the wet season</li> </ul> <p>Groundwater</p> <ul style="list-style-type: none"> <li>• Bukalara Aquifer is not included as an aquifer that Origin will ensure is protected from mixing with other aquifers</li> <li>• impacts to groundwater sources for local communities, which could be vulnerable to contamination from hydraulic fracturing fluids via porous and fractured limestone aquifers</li> <li>• scarcity of the groundwater resource and impacts of the industry groundwater use on the resource</li> <li>• lack of information on monitoring of fracture distances and potential groundwater contamination from hydraulic fracturing fluids</li> </ul>

	<ul style="list-style-type: none"> <li>• implications of low estimated flowback volumes of hydraulic fracturing fluids</li> <li>• lack of information regarding radon decay products</li> </ul>
	<p>Hydrogeology</p> <ul style="list-style-type: none"> <li>• inadequate understanding of the hydrogeology of the NT</li> <li>• potential for hydraulic fracturing fluids to contaminate aquifers via faults and fractures</li> </ul>
Waste (13.4%)	<ul style="list-style-type: none"> <li>• disposal methods of toxic waste</li> <li>• management of waste streams</li> <li>• analysis of waste water and flowback fluids</li> <li>• transportation of toxic waste interstate, as opposed to treatment options in the NT</li> </ul>
Climate change (10.5%)	<ul style="list-style-type: none"> <li>• development of an industry that will result in increased GHG emissions and contribute to Australia's impact on climate change</li> <li>• the EMP does not propose emission offsets as per HFI recommendation 9.8, or consider scope 3 GHG emissions</li> <li>• hydraulic fracturing may lead to undetected methane leaks occurring</li> </ul>
Human health (9.4%)	<ul style="list-style-type: none"> <li>• chemicals may pollute aquifers that are used for agriculture and/or drinking and have long-term impacts on human populations</li> <li>• lack of adequate testing by regulatory agencies to determine chemical safety</li> <li>• migration of chemicals through food chain and/or aquifers</li> <li>• volumes of chemicals that will be used by industry exceed current testing</li> <li>• lack of bio-accumulation data</li> </ul>
Chemicals (9.2%)	<ul style="list-style-type: none"> <li>• toxicity and harmfulness of chemicals</li> <li>• adequacy of the chemical risk assessment to protect the community and environment</li> <li>• lack of information about chemicals used by industry</li> <li>• lack of appropriate scrutiny</li> </ul>
Regulation and compliance (8%)	<ul style="list-style-type: none"> <li>• quality of NT Government implementation of regulatory reforms, in particular approval of EMPs without finalisation of the Code, amendments to the Water Act 1992 and appended Well Operations Management Plan (WOMP)</li> <li>• application of the principles of Ecologically Sustainable Development (ESD), including the Precautionary Principle</li> <li>• lack of assessment of cumulative impacts in accordance with HFI recommendation 14.21</li> <li>• use of open tanks is inconsistent with HFI recommendation 7.12 and poses a risk to downstream aquatic environments</li> <li>• definition of a regulated activity as it applies to this EMP</li> </ul>
Other (4.1%)	<ul style="list-style-type: none"> <li>• sourcing of proppant sand</li> </ul>

	<ul style="list-style-type: none"> <li>• structural integrity of construction materials to withstand excessive heat, flooding or other climatic conditions</li> <li>• flaring</li> <li>• naturally occurring radioactive materials</li> </ul>
Traffic and roads (3.9%)	<ul style="list-style-type: none"> <li>• increase in local traffic will lower amenity for residents</li> <li>• damage to road infrastructure will have to be covered by ratepayers</li> <li>• impacts of petroleum traffic on tourism</li> </ul>
Economic (<1%)	<ul style="list-style-type: none"> <li>• economic viability of the industry, including cost benefit analysis, maximising opportunities for Territory businesses, economic baseline studies and gas exports</li> </ul>
Well integrity (<1%)	<ul style="list-style-type: none"> <li>• construction standards, including method of bore case cementing, aquifer screen</li> <li>• structural failure rate</li> </ul>

- o. I note that most of the submissions (> 90%) 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.
- p. I recognise the importance the community places on the protection of water, fauna, management of chemicals and waste (pollution), human health and safety, stakeholder engagement, and the implications that may arise from development of the industry. The final EMP appropriately identifies the risks and potential impacts raised in submissions and commits to mitigation and management measures to address these risks and potential impacts.
- q. Approximately 14.2% of public submissions raised concerns about social aspects such as stakeholder engagement, especially the adequacy of the stakeholder engagement with affected Aboriginal communities, neighbours, local businesses, etc. The EMP provides details of stakeholder engagement that meets regulations 7 and 9 of the Regulations (Section 5 and Appendix I).
- r. Approximately 13.5% of public submissions raised concern with aspects of the environment particularly related to animal welfare and interactions with various aspects of the regulated activity, including for example, contaminated water, open tanks and flaring. The EMP appropriately identifies the risks and potential impacts raised in these submissions and is committed to implementing routine remote camera monitoring to log fauna interactions with wastewater tanks and the drill cuttings sump, and implementation of additional controls such as netting or the use of other bird deterrents if required.
- s. Approximately 13.4% of public submissions raised concerns about water including impacts to groundwater from, for example, contamination from hydraulic fracture stimulation, drawdown on groundwater supplies and downstream impacts from spills and/or loss of containment. The EMP appropriately identifies the risks and potential impacts raised in these submissions, particularly through the chemical risk assessment (Appendix C) and the strict well construction and well integrity practices, which are mandated in the Code to mitigate potential impacts from drilling and hydraulic fracture stimulation, such as contamination to, or mixing of, groundwater aquifers.



- t. Approximately 13.4% of public submissions raised concerns about waste generated during hydraulic fracture stimulation and proposed management practices. For example the use of open tanks to evaporate and manage waste water volumes, and the lack of treatment facilities in the NT, resulting in the transportation of residual waste volumes to interstate treatment facilities. The EMP appropriately identifies the risks and potential impacts raised in submissions and the management practices that will be implemented to mitigate them.
- u. Approximately 10.5% of public submissions raised concerns about climate change; in particular how development of the industry will lead to increased greenhouse gas emissions and contribute to Australia's impact on climate change. The EMP provides details of cumulative greenhouse gas emissions from current and proposed regulated activities being undertaken by the Interest holder. The EMP commits to the greenhouse gas emission mitigation and monitoring requirements of the Code. I note that the NT climate change and environmental offsets policies are under development and will be progressed in parallel with the delivery of the NT Government's hydraulic fracturing Implementation Plan.
- v. Approximately 9.4% of public submissions were concerned with the long term impacts of the regulated activity on human health, particularly arising from the chemicals used during hydraulic fracture stimulation and potential contamination of groundwater and surface water sources. As stated above (l), the EMP provides a Wastewater Management Plan, Spill Management Plan, Erosion and Sediment Control Plan, Emergency Response Plan, Methane Emission Management Plan and Chemical Risk Assessment, and specific petroleum well integrity criteria and monitoring programs that meet the requirements of the Code. These plans adequately identify how the potential impacts and risks associated with chemical use will be mitigated.
- w. A number of public submissions raised concern about appropriate regulation and compliance (approximately 7.7%) of the EMP against the Code and the Water Act 1992. I note that interest holder revised the EMP to ensure it meets the requirements of the final Code and amendments to the Water Act 1992. Concern was raised about the separation of different regulated activities in EMPs that makes it difficult to assess the cumulative effects and risks of the entire exploration activity. I consider the cumulative effects have been appropriately addressed at this early stage of exploration activities.
- x. I am satisfied that the concerns and issues raised have been adequately mitigated and/or addressed in this EMP.
- y. There are no environmental impacts or environmental risks relating to the proposed regulated activity which I consider to be unacceptable.
- z. 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.