

Onshore Petroleum Activity – NT EPA Advice

ORIGIN ENERGY B2 PTY LTD (ORI7-2) – ENVIRONMENT MANAGEMENT PLAN (EMP) FOR AMUNGEE NW-1H, EXPLORATION PERMIT (EP98) BEETALOO SUB-BASIN NT

BACKGROUND

The Minister for Environment has formally requested under section 29B of the *Northern Territory Environment Protection Authority Act 2012* (NT EPA Act) that the Northern Territory Environment Protection Authority (NT EPA) provide advice on all Environment Management Plans (EMPs) received under the Petroleum (Environment) Regulations 2016 (the Regulations).

That advice must include a recommendation on whether the EMP should be approved or not, supported by a detailed justification that considers:

- whether the EMP is appropriate for the nature and scale of the regulated activity to which the EMP relates (regulation 9(1)(b))
- whether the EMP demonstrates that the activity will be carried out in a manner by which the environmental impacts and environmental risks of the activity will be reduced to a level that is as low as reasonably practicable and acceptable (regulation 9(1)(c))
- the principles of ecologically sustainable development (regulation 2(a)), as set out in sections 18 to 24 of the *Environment Protection Act 2019*, and
- any relevant matters raised through the public submission process; for this EMP, no public consultation was required.

In providing that advice, the NT EPA Act provides that the NT EPA may also have regard to any other matters it considers relevant.

ACTIVITY

Subject	Description
Interest holder	Origin Energy B2 Pty Ltd
Petroleum interest(s)	Exploration Permit 98 (EP98)
Environment Management Plan (EMP) title	Amungee NW-1H Environment Management Plan EP98 - Beetaloo Sub-Basin, NT
EMP document reference	ORI7-2
Regulated activity	The EMP proposes an extended production test (EPT) to understand the technical and commercial viability of the Velkerri dry gas shale resource; and to evaluate longer term production rates and decline curves of the existing Amungee NW-1H well. NW-1H is located 260 km ENE of Borroloola in the centre of EP98 in the Beetaloo Sub-basin. The regulated activity is as follows:

Subject	Description
	<ul style="list-style-type: none"> • civil maintenance of the Amungee NW-1H well site through erosion and sediment controls (ESC), roads and lease pad • on-site construction of wastewater tanks, wastewater bunding and stormwater retention pond • an EPT on the constructed Amungee NW-1H well, which includes flaring and wastewater storage • operation of a temporary camp, offices and equipment storage areas • maintenance and monitoring of infrastructure on the Amungee NW-1H site • reservoir testing and data acquisition using reservoir evaluation tools • monitoring and recording build-up pressures post EPT • suspension and/or abandonment of the Amungee NW-1H well. <p>The regulated activities do not require any new ground disturbance and the existing lease pad, camp pad and access tracks will be used.</p> <p>No drilling or hydraulic fracture stimulation (HFS) activities are proposed in the EMP.</p> <p>Site decommissioning and rehabilitation will commence on or before Quarter 4 2022. A rehabilitation plan is included as Appendix K.</p>
Public consultation	Public consultation on the revised EMP was not required under regulation 8A(1)(b); as the EMP does not propose drilling or hydraulic fracturing.

The Amungee NW-1H exploration and appraisal (E&A) well was drilled in October–November 2015 to a total depth of 2,611 m below ground level (mbgl), with a 1,229 m horizontal section. A proposed HFS and test of the well Environment Plan (EP) was approved in August 2016.¹ A hydraulic fracture stimulation (HFS) was conducted in August - September 2016, followed by a 57 day well test. The well was suspended in November 2016 and the site was demobilised.

The EMP is a revision of the existing 2016 Hydraulic Stimulation and Well Testing EP approved in August 2016. The revision is based on regulation 18 of the Petroleum (Environment) Regulations 2016, which requires the revision of a current plan at end of each 5 year period. The revised EMP covers the changes in legislation since the original approval date, including the requirements of the Petroleum (Environment) Regulations 2016 and the Code of Practice for Onshore Petroleum Activities within the Northern Territory (Code of Practice). The key outcomes from the regulated activity will be used to manage the existing Amungee NW site and associated Amungee NW-1H appraisal well. The purpose of the EPT will be to collect data from the NW-1H well to understand the gas and water rates from the Velkerri shale formation.

¹ Origin Energy Resources Limited. 2016 Hydraulic Stimulation and Well Testing EP: Amungee NW-1H, and Beetaloo W-1 or Nutwood Downs SW-1. CDN/ID NT-2050-35-PH-0018 Revision 1.2 17 August 2016.

The proposed EPT consists of:

- flowback of fluids (wastewater) and hydrocarbons
- separation of hydrocarbons from wastewater
- measurement of hydrocarbons
- storage and treatment of flowback wastewater
- ongoing quality sampling of flowback and hydrocarbons
- disposal of gaseous hydrocarbons

The Amungee NW-1H well will be brought back online and undergo the EPT for approximately 30 days. The production water and hydrocarbons from the test will be directed through a fully contained separator on-site, to separate the gases, fluids and solids to be measured and managed. After testing, the gaseous hydrocarbons (C1-C4) will be directed to an onsite vertical flare and flowback wastewater discharged directly to an enclosed wastewater tank.

An overview of the proposed well testing equipment layout is provided in Figure 1.

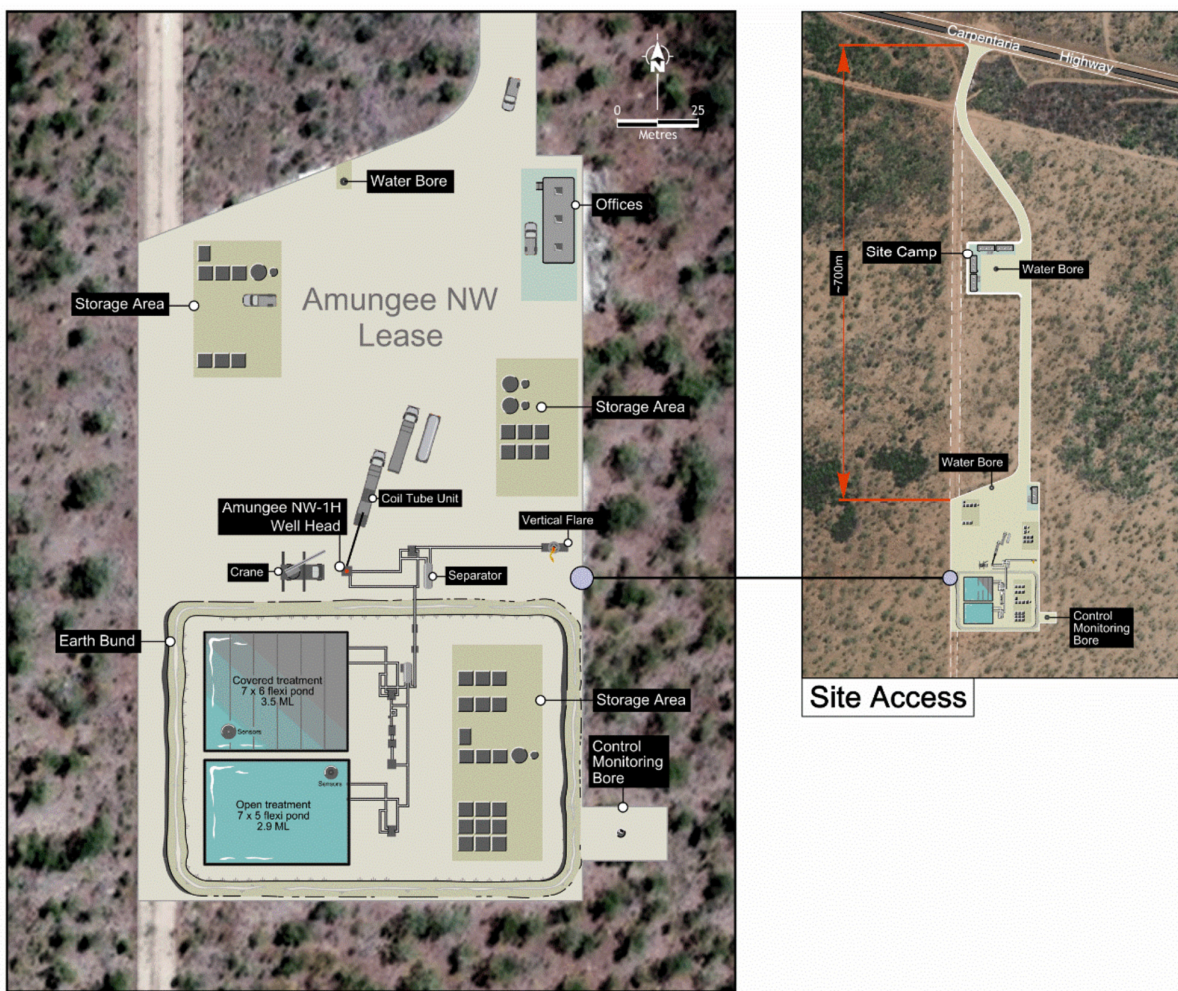


Figure 1: Amungee NW site schematic and layout.

NT EPA ADVICE

1. Is the EMP appropriate for the nature and scale of the regulated activity (regulation 9(1)(b))

Information relating to the nature and scale of the regulated activity is provided in the EMP in a clear format. The technical works program includes an EPT and related exploration activities during 2021 – 2026 (including rehabilitation) on the existing EP98 Amungee NW-1H well site. No drilling or hydraulic fracture stimulation activities are proposed in the EMP. On completion of the EPT, the well will either be suspended for future re-entry or decommissioned with permanent cement plugs and rehabilitated in accordance with the requirements outlined in the Code of Practice: Onshore Petroleum Activities in the Northern Territory (the Code).

The total footprint for the regulated activity is 5.25 ha, consisting of a pre-existing lease pad, camp pad and access track. There is no additional land clearing proposed in this EMP. Decommissioning and rehabilitation are planned for (or before) Quarter 4 2022. A rehabilitation plan has been developed for the activity, to return the disturbed land to an environment similar to the pre-disturbance conditions. Table 1 provides an overview of the key components of the regulated activity.

Table 1: Key components of the proposed Origin EPT program

COMPONENT	REGULATED ACTIVITY
Wells (#)	1 (pre-existing) Amungee NW-1H
Groundwater extraction licence	GRF 10285
Total area of exploration lease (EP98)	10,129 km ²
Number of lease pads	1 (pre-existing)
Number of groundwater monitoring bores	3 (pre-existing): RN040894, RN38493 and RN39896
Number of gravel pits	Nil
Number of creek crossings	Nil
Timing of works	Q3 2021 to Q4 2022 (with ongoing maintenance, rehabilitation and monitoring until Q3 2026)
Camp capacity and workforce	~20 persons during operations
Peak traffic movements (per day)	~16 (during mobilisation & demobilisation)
Truck movements during operations (per day)	4 - 6
Estimated total groundwater usage (ML)	~3.2
Estimated potable water usage (kL) per day	5
Diesel (kL)	95
Greenhouse gas emissions (tCO ₂ -e)	~2,405
Rehabilitation (ha)	5.25
Flowback/wastewater volume generated onsite (ML)	1
Flowback/wastewater volume (final predicted for treatment and offsite disposal)	~0.15

A rehabilitation plan (Appendix K) has been developed for the activity, to minimise the risk of site erosion and return the disturbed land to the original conditions long term, in accordance with clause A.3.5 of the Code.² The plan will be enacted after the EPT - if the interest holder decides to plug and decommission the NW-1H well. All disturbed areas will be rehabilitated, including the well pad and

² Code of Practice: Onshore petroleum activities in the Northern Territory

associated infrastructure. All surface infrastructure and waste will be removed from site and disposed of in accordance with the Regulations and specifically the *NT Waste Management and Pollution Control Act 1999* – including wastewater tanks, wastewater and ancillary equipment.

The EMP identifies wastewater as water generated from well testing, dust suppression and camp activities. A large proportion of the volume of wastewater generated will be evaporated during operations. At the end of operations, the remaining predicted 0.2 ML of wastewater will be removed offsite to an existing approved location for treatment and disposal (after evaporation). Enclosed double-lined above ground tanks with leak detection will be used as the primary wastewater storage facility, with enough capacity to store all wastewater on-site. Flowback fluid generated during well testing will be held on site and involves the use of one above ground enclosed tank of 1 ML capacity, and one 1 ML above ground open evaporation tank to reduce the amount of wastewater feasibly required to be disposed of offsite. The available enclosed tank capacity exceeds the total predicted flowback wastewater volume of 0.7 ML. Large pumps will be installed, with a capacity of approximately 23 ML per day. When a significant rainfall event is predicted, the total volume of flowback fluid on site will be transferred to enclosed/covered tanks 8 hours prior to the event.

Information on the location and scale of the proposal is included in the EMP. The existing environment has been adequately described through baseline surveys and is suitably understood. There are no areas of high conservation value in the vicinity of the regulated activity. Areas of cultural significance have been identified in EP98 from cultural heritage surveys. These will be protected through:

- the implementation of restricted work area protocols, in accordance with the provisions outlined in the Aboriginal Areas Protection Authority (AAPA) Authority Certificate C2020/003
- the nearest restricted Work Area is located at a waterhole over 8 km from Amungee NW and no access or works will be undertaken within 500 m of the Sacred Site
- all staff to be inducted covering restricted work areas and cultural heritage
- implementation of an “unexpected finds” procedure.

The interest holder has identified the impacts and risks associated with the regulated activity (58 in total). Mitigations outlined in the risk register, Appendix I are classified based on the hierarchy of controls, and impacts and risks should be reduced to an acceptable level through the proposed mitigation and management measures. Environmental performance standards and measurement criteria have been provided in the EMP (section 6).

The level of detail and the quality of information provided in the EMP is sufficient to inform the evaluation, assessment and management of environmental impacts and risks, and meets the approval criteria under Regulation 9 for the Minister’s decision about approval of the environment management plan.

2. Principles of ecologically sustainable development (regulation 2(a))

2.1 Decision-making principle (s 18 *Environment Protection Act 2019*)

The revised EMP adequately assesses the environmental impacts and risks associated with the regulated activity and outlines appropriate avoidance and mitigation measures. The impacts and risks associated with the EPT program have been assessed. Of the 58 risks identified, 52 are assessed as ‘low’ if carried out in accordance with the mitigations and controls proposed in the EMP. Wet season contingencies and controls are proposed to mitigate potential erosion and sediment impacts associated with runoff from disturbed areas, off-site wastewater release, or transport of chemicals and wastewater. These controls have been assessed by NT Government agencies and deemed adequate.

The interest holder has demonstrated ongoing stakeholder engagement (e.g. communications log) for the regulated activity in the EMP as required by the Regulations, with identified, directly affected stakeholders.

2.2 Precautionary principle (s19 *Environment Protection Act 2019*)

The NT EPA considers there is a low risk of serious or irreversible damage from the regulated activity. The regulated activity will be conducted in compliance with the Code, and the EMP provides measurable performance standards to ensure that environmental outcomes are met.

The risk assessment clearly classifies the hierarchy of controls for the mitigations applied to each risk (e.g. eliminate, substitute, engineering, administrative, personal protective equipment). Uncertainty in relation to the environmental features was assessed, with no areas of environmental uncertainty identified. The EMP outlines the interest holder's investigations into the physical, biological and cultural environment and demonstrates a sound understanding of the environment at the location, providing a satisfactory scientific basis to assess potential environmental impacts and risks for the activity, and to identify measures to avoid or minimise those impacts and risks.

The interest holder has adopted mitigation controls for bushfire management and ecological protection as used by other petroleum companies who have undertaken similar exploration activities in the Barkly Region during this time of the year. These include a minimum of 45 m horizontal separation distance between the vertical flare and surrounding vegetation; no flaring during periods of total fire ban; and having firefighting equipment available to tackle fires.

Measures for managing risks during wet season operations include:

- chemicals, fuels, equipment, tanks and materials required for ongoing operations will be preferentially stored on-site prior to the onset of the wet season to minimise transportation risks
- chemicals storage areas will be bunded, with covers (where safe and appropriate) to prevent rain ingress and bund overflows
- open working evaporation tanks having sufficient freeboard to manage an entire 1:1000 ARI wet season event (i.e. an entire season's rainfall total)
- the wastewater storage areas will be bunded from the rest of the well site and designed to divert stormwater to prevent contamination
- no transportation of wastewater or chemicals during the wet season unless a task specific risk assessment is completed prior to the transport (to ensure site conditions are constantly updated) that demonstrates the risk is ALARP and acceptable (as per the Code of Practice).

The NT EPA is of the view the precautionary principle has been considered in assessing the regulated activity and has not been triggered, due to the low threat of serious or irreversible damage and a satisfactory scientific basis to assess potential impacts and risks. In addition, the environmental monitoring commitments contained in the EMP are compliant with the Code and should provide performance measures to ensure that the environmental objectives are met.

2.3 Principle of evidence-based decision-making (s20 *Environment Protection Act 2019*)

The EMP proposes that exploration activities, including the EPT and associated minor civil works and progressive rehabilitation are planned to commence during the dry season in 2021 and continue over a five year period to Q3 2026. These activities will be conducted during the dry season wherever possible and wet weather contingencies to be implemented if activities continue into the wet season (October to April inclusive).

A certified Erosion and Sediment Control Plan (ESCP) (Appendix H) contains design and management controls to mitigate potential erosion under sheet flow conditions. Elevation plans and layout for the Amungee NW-1H pad and access tracks are provided in the ESCP.

Traffic impacts were assessed as being low and short in duration, reflecting the limited size and scope of the activity. The camp is located away from the Carpentaria Highway with most vehicle movements between the camp and drill sites. The peak traffic volume from the activity on the Carpentaria Highway is estimated at 16 vehicles per day during mobilisation, which is insignificant compared to the Level of Service of the highway (more than 700 vehicles/day). The interest holder has considered additional mitigation controls such as limiting drive in/drive out workers.

The NT EPA has assessed the potential for spills from chemicals and hydrocarbons (e.g. diesel) stored in designated banded areas at the accommodation camp and on the Amungee NW-1H pad. The mitigation controls described in the EMP include: secondary containment for all chemical storage and handling areas; containment of hydrocarbons in dual walled, self banded diesel tank; and spill prevention and response procedures for hazardous spill prevention, monitoring, assessment, response and clean-up.

The NT EPA has recommended the interest holder maintain a spill register, the contents of which are to be reported/submitted annually to DEPWS.

The NT EPA is of the view that the evidence-based decision-making principle has been considered in assessing the regulated activity.

2.4 Principle of intergenerational and intra-generational equity (s21 *Environment Protection Act 2019*)

The potential environmental impacts and risks associated with the regulated activity can be adequately avoided or managed through the management measures and monitoring programs proposed in the EMP.

The GHG emissions from the activity is approximately 2,400 tonnes of carbon dioxide equivalent (tCO₂-e), generated, comprising approximately 2,145 tCO₂-e from flaring, 253 tCO₂-e from diesel combustion and 7.64 tCO₂-e from fugitive emissions from wastewater storage. This represents approximately 0.01% of the 2019 NT estimated GHG emissions (20.6 million tCO₂-e).³ The NT EPA recommends the interest holder provide to DEPWS annual actual greenhouse gas emissions generated by the regulated activity from all sources.

Protection of cultural interests is achieved through compliance with the requirements of Authority Certificates issued by the Aboriginal Areas Protection Authority under the *Northern Territory Aboriginal Sacred Sites Act 1989* (NT) and the previously completed archaeological assessment at the site to avoid archaeological heritage impacts. The regulated activity will be subject to requirements of an existing Aboriginal Areas Protection Authority (AAPA) Authority Certificate (C2020/003), which covers all activities in the current EMP.

The interest holder has identified relevant stakeholders and carried out stakeholder engagement in accordance with regulation 7. Interactions between the regulated activity and pastoral operations have been assessed; the interest holder is committed to regular engagement with pastoralists via progress updates.

The NT EPA considers that environmental values will be protected in both the short term and long term, and that the health, diversity and productivity of the environment will be maintained for the benefit of future generations.

2.5 Principle of sustainable use (s22 *Environment Protection Act 2019*)

Origin has an existing groundwater extraction licence (WEL GRF 10285) to conduct activities under this EMP. Water sourced for the EPT activities will be extracted from the Gum Ridge extraction bores RN040894, RN38493 and RN39896. Groundwater take will be metered; the combined total of groundwater from all sources is approximately 3.2 ML, comprising approximately:

- 2 ML for the EPT, mostly for tank commissioning
- 1.2 ML for camp activities, dust suppression and general activities

The cumulative impact associated with current and future groundwater takes were addressed in the Water Extraction Licence (WEL) GRF 10285 statement of reason, which was assessed to be well within the sustainable yield of the Gum Ridge Formation (1,412,800 to 2,825,600 GL).

³ Source: DISER 2020. *State Greenhouse Gas Inventory*. <https://ageis.climatechange.gov.au/SGGI.aspx>.

The interest holder has demonstrated a commitment to reuse, recycle, and minimise the use of natural resources wherever possible, without introducing significant environmental impacts and risks.

2.6 Principle of conservation of biological diversity and ecological integrity (s23 Environment Protection Act 2019)

The EMP for the regulated activity has been informed by a number of sources, including:

- two land condition assessments in 2014 and 2018 that reviewed the physical, natural and cultural heritage environment of the existing Amungee NW site
- ongoing routine field weed surveys at the location since 2014
- an archaeological assessment in August 2018 of E & A sites within EP 117 and EP 98, including Amungee NW.

The Amungee NW site is located within open *Corymbia* woodland, which is characterised by dense grass and shrub cover on lateritic soils. This vegetation community is regionally extensive across the tropical savannas of the Northern Territory. There are no threatened vegetation communities listed or likely to occur within or in proximity to the Amungee NW site. The closest areas of conservation significance to the site are:

- the Bullwaddy Conservation Reserve, located ~40 km ESE from the proposed activity area
- the EPBC Listed Lake Woods, located ~160 km south from the proposed activity area and is listed on the National Directory of Important Wetlands.

The EMP identifies 20 fauna species listed as threatened under the EPBC Act and/or the TPWC Act. An assessment of the likelihood of occurrence indicates four listed threatened species that are likely to occur based on habitat suitability and previous records:

1. Gouldian Finch *Erythrura gouldiae* (Endangered EPBC Act, Vulnerable TPWC Act).
2. Grey Falcon *Falco hypoleucos* (Vulnerable TPWC Act).
3. Crested Shrike-tit (northern) *Falcunculus frontatus whitei* (Vulnerable EPBC Act, Near Threatened TPWC Act).
4. Painted Honey Eater *Grantiella picta* (Vulnerable EPBC Act, Vulnerable TPWC Act).

The DEPWS Flora and Fauna Division is satisfied that that the regulated activity does not pose a significant risk to threatened species, important habitats or significant vegetation types. Further, the mitigation controls identified in the EMP are adequate to reduce risks associated with potential impacts on biodiversity, such as trapping and drowning of fauna in storage tanks, vehicle strike, dust, erosion and spills to be as low as reasonably practicable.

The NT EPA has recommended the interest holder provide to DEPWS an updated rehabilitation plan, concurrent with submission of an annual environment performance report.

The EMP outlines measures to minimise impacts on affected environmental values, including the management of threatening processes such as weeds and fire. Where relevant, management measures for the threatening process are consistent with the requirements of the Code, NT Land Clearing Guidelines and Weed Management Planning Guideline: Onshore Petroleum Projects.

The NT EPA considers that implementation of the EMP for the regulated activity should ensure the conservation of biological diversity and ecological integrity.

2.7 Principle of improved valuation, pricing and incentive mechanisms (s24 Environment Protection Act 2019)

The interest holder will be required to prevent, manage, mitigate and make good any contamination or pollution arising from the regulated activity, including contamination of soils, groundwater and surface waters through accidental spills.

All stages of the regulated activity, including progressive rehabilitation of all disturbed areas to an acceptable standard, will be at the cost of the interest holder.

The interest holder is required to provide an adequate environmental rehabilitation security bond to indemnify the NT Government. This is based on an assessment by DEPWS of the estimated rehabilitation cost submitted by the interest holder. The rehabilitation costs for the regulated activity is supported by independent contractor quotes.

The NT EPA is of the view the principle of improved valuation, pricing and incentive mechanisms has been considered in assessing the regulated activity and is based on the interest holder bearing any environmental costs for the activity.

3. Does the EMP demonstrate that the activity will be carried out in a manner by which the environmental impacts and environmental risks of the activity will be reduced to a level that is as low as reasonably practicable and acceptable (regulation 9(1)(c))

The interest holder has undertaken measures to avoid impacts on environmental values, informed by a detailed understanding of site conditions, obtained through baseline studies and surveys conducted on EP98.

The EMP demonstrates a systematic identification and assessment of environmental impacts and risks associated with the regulated activity. The key environmental impacts and risks considered in the EMP are:

- impacts to flora and fauna, cultural heritage sites and air quality due to accidental ignition of fire from exploration activities (site preparation, flaring and general access).
- a reduction in land productivity due to introduction and spread of weeds
- impacts to soils, surface water and groundwater resulting from potential spills, leaks and loss of containment of chemicals/hydrocarbons during transport, storage and use
- Soil erosion from cleared areas (existing access tracks, lease pad and camp pad)
- generation of greenhouse gases from flaring and diesel combustion.

The EMP also considers cumulative impacts to groundwater, flora and fauna, greenhouse gases, traffic and social, and concludes the cumulative impacts are not significant.

The EMP has considered the hierarchy of controls (elimination, substitution, engineering, administration) and demonstrated that the controls to be implemented are considered ALARP and acceptable. Of the 58 environmental risks identified by the interest holder, 52 are considered 'low' risk, and therefore are ALARP. The remaining 6 risks are considered 'medium' and the interest holder has included mitigations that can/will be implemented such that the risks will therefore be managed at levels that are ALARP and acceptable.

Key risk mitigations include:

1. *Impacts to flora and fauna, cultural heritage sites and air quality due to accidental ignition of fire from exploration activities:* The interest holder has committed to, for example, implementing a bushfire management plan (Appendix C) to prevent and respond to bushfires including establishment of communication and fire response protocols with pastoralists; having firefighting equipment to deal with fires; constructing fire breaks around the Amungee NW lease and camp pads; maintaining a 45 m horizontal separation distance between the vertical flare and surrounding vegetation; placing ignition sources placed outside of the hazardous area; not conducting flaring during periods of total fire ban; complying with landholder and regional

bushfire management plans; daily monitoring of bushfires in the region during periods of high fire danger; and where required, fire hazard reduction strategies (such as back burning) to be implemented to reduce the risk of fire ignition/impact. The 'medium' risk rating is based on the likelihood being considered 'highly unlikely', but the consequence of the event being 'serious'.

2. *A reduction in land productivity due to introduction and spread of weeds:* The interest holder has committed to wash-down all vehicles and equipment and to have a Biosecurity Declaration Certificate prior to access to site; restrict exploration activity to defined lease pads and camp pads; conduct six-monthly monitoring around infrastructure to detect the spread/introduction of weed species; treat weed infestations in accordance with the Weed Management Plan; and implement corrective actions where ongoing biosecurity breaches are identified. The 'medium' risk rating is based on the likelihood being considered 'unlikely', but the consequence of the event being considered 'moderate'.
3. *Impacts to soils, flora and fauna, surface water and groundwater resulting from potential spills, leaks and loss of containment of chemicals/hydrocarbons during transport, storage and use:* The interest holder has committed to, for example, to use tanks that are designed and engineered to AS3990 Mechanical Equipment- Steel Work, AS 1170.1 Hydrostatic loading, AS1170.2 Wind Rating (cyclonic wind rating); use a wastewater tank liner with an impermeable membrane with coefficient of permeability of less than 10^{-9} m/s permeability, 120N puncture resistance and 49N tear resistance; use covered wastewater tanks with enough capacity to deal with anticipated storage volumes and have vents to prevent pressure build up; compacted lease pad to above 100 kpa to achieve a permeability of approximately 1×10^{-7} m/s; The wastewater storage area is earthen bunded to prevent offsite release of flowback water; flowback water to be transferred to enclosed tanks 8 hours before the onset of a significant rainfall event (defined as >300 mm of rain over a 4 day period); wastewater storage area earthen bunding having a minimum capacity of at least 120% of the largest wastewater tank volume; weekly wastewater tank integrity inspections during wastewater storage; contamination events characterised and remediation plans developed and executed in accordance with the process outlined in schedule A of the *National Environmental Protection (Assessment of site Contamination) Measures*; licenced waste transporters to be used to transport listed wastes; chemicals to be transported in accordance with the Australian Dangerous Goods Code and NT Dangerous Goods Act. The 'low' risk rating is based on the likelihood being considered 'highly unlikely' to 'unlikely', but the consequence being from 'moderate' to 'serious'.
4. *Soil erosion from cleared areas:* The interest holder has committed to, for example, adhering to the Erosion and Sediment Control Plan (Appendix H); maintain the site with erosion and sediment controls; conducting pre and post wet season erosion and sediment control inspections; stockpiling debris to prevent water concentration. The 'low' risk ranking is based on the consequence being considered 'minor' and the likelihood being considered 'unlikely'.
5. *Generation of greenhouse gases:* The interest holder has committed to submit Well design and Well Barrier Integrity Validation reports to DITT as part of a Well Operations Management Plan (WOMP); gas production limited to extended production test; conduct routine 6-monthly well leak detection tests and monthly well inspections; sites are manned during operation (during well testing); equipment adheres of Australian emission standards and is maintained in accordance with the manufacturer recommendations; routine site inspections and assurance undertaken to ensure equipment is maintained and operated as per manufacturers requirements; flares are designed and operated in compliance with the US EPA 40 CFR § 63.18 to achieve a 98% combustion efficiency; Flares will be inspected as a part of weekly routine site inspection to rectify any excessive smoke production; Process monitoring to detect events that could potentially result in a uncontrolled release of gas (such as fluid balances, well head pressure etc.). The 'low' risk ranking is based on the consequence being considered 'moderate', but the likelihood of the event ranging from 'highly unlikely' to 'remote'.

The measures provided are appropriate to the nature and scale of the activity, and if implemented, the residual risk to the environment is likely to be acceptable.

The NT EPA considers that all reasonably practicable measures will be used to control the environmental impacts and risks, considering the level of consequence and the resources needed to mitigate them. The NT EPA considers that the environmental impacts and risks will be reduced to an

acceptable level, considering the sensitivity of the local environment, relevant standards and compliance with the Code.

4. Other relevant matters

Regulation 9 requires that an EMP provides a comprehensive description of the regulated activity, including provision of a detailed timetable for the activity. The EMP includes a schedule (Table 8 and Figure 5), outlining the sequencing of works. The NT EPA has provided advice that the interest holder be required to submit an updated timetable for the regulated activity prior to commencement. The timetable should address all aspects of the activity and include, but not be limited to, dates for the implementation of commitments and should be updated monthly or as other constraints, such as seasonal weather forecasts or travel restrictions emerge.

CONCLUSION

The NT EPA considers that, subject to the recommended EMP approval conditions, the EMP:

- is appropriate for the nature and scale of the regulated activity
- demonstrates that the regulated activity can be carried out in a manner such that the environmental impacts and risks of the activity will be reduced to a level that is as low as reasonably practicable (ALARP) and acceptable.

In providing this advice the NT EPA has considered the principles of ecologically sustainable development.

RECOMMENDATIONS

The NT EPA recommends that, should the EMP for Origin Energy B2 Pty Ltd Amungee NW-1H EP98 be approved, the following conditions be considered:

Condition 1: The interest holder must submit to DEPWS:

- i. an updated timetable (including time-bound commitments) for the regulated activity prior to commencement of the activity and each month thereafter; and
- ii. weekly on-site reports indicating the status and progress of the EPT, freeboard available in wastewater tanks during operations, and monthly reports on progressive rehabilitation in progress/completed; and
- iii. written notification of any halt to the activity due to wet season conditions, within 24 hours of the halt; and
- iv. immediate written notification of any fires potentially threatening the activity from external or internal factors.

Condition 2: To support clause C.7.2 of the Code, all accidental releases of liquid contaminant must be recorded immediately in a spill register. The register must include:

- i. location, source and volume of the spill;
- ii. volume of impacted soil removed for appropriate disposal and the depth of any associated excavations;
- iii. the corrective actions taken or proposed to be taken to prevent recurrence of an incident of a similar nature; and
- iv. update of a geospatial register of spills.

The spill register including geospatial files must be reported/submitted annually.

Condition 3: The interest holder must provide an annual report to DEPWS on its environmental performance, in accordance with item 11 (1)(b) in schedule 1 of the Petroleum (Environment) Regulations 2016. The first report must cover the 12 month period from the date of the approval, and be provided within three calendar months of the end of the reporting period. The annual environment performance report must align with the template prepared by DEPWS for this purpose and must include a signed declaration by the interest holder.

Condition 4: To support clause A.3.9 of the Code and the EMP rehabilitation plan, the interest holder is to provide an updated rehabilitation plan to DEPWS, concurrent with submission of the annual environment performance report. The amended rehabilitation plan must include:

- i. auditable success criteria for rehabilitation and corrective actions in the event rehabilitation monitoring shows success criteria are not achieved
- ii. an annual summary of progressive rehabilitation outcomes, and
- iii. be accompanied by geospatial files of all surface disturbance areas, including those under rehabilitation.

The rehabilitation plan must be implemented until a successful outcome is achieved and documented.

Condition 5: To support clause D.6.2 (b) of the Code, an emissions report must be provided to DEPWS by 30 September each year, which summarises actual greenhouse gas emissions reported under the Australian Government's *National Greenhouse and Energy Reporting Act 2007* versus the predicted emissions in the EMP.⁴



PAUL VOGEL AM
CHAIRPERSON

NORTHERN TERRITORY ENVIRONMENT PROTECTION AUTHORITY

25 JUNE 2021

⁴ Clause D.6.2(b) of the Code requires annual actual greenhouse gas emissions to be provided even where emissions are below the NGERs threshold of 25 ktCO₂-e for scope 1 and scope 2 emissions reporting.