

Onshore Petroleum Activity – NT EPA Advice

TAMBORAN B2 PTY LTD – BEETALOO BASIN SHENANDOAH SOUTH E&A PROGRAM ENVIRONMENT MANAGEMENT PLAN (EMP), EP98 AND EP117 (TAM1-3)

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) of the Regulations)
- the principles of ecologically sustainable development (regulation 2(a) of the Regulations), as set out in sections 18 to 24 of the *Environment Protection Act 2019* (NT)
- 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 (ALARP) and acceptable (regulation 9(1)(c) of the Regulations)
- any relevant matters raised through the public submission process.

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	Tamboran B2 Pty Ltd (Tamboran) (as Operator) on behalf of; Tamboran B2 Pty Ltd Falcon Oil and Gas Australia Ltd
Petroleum interest(s)	Exploration Permits 98 and 117
Environment Management Plan (EMP) title	Beetaloo Basin Shenandoah South E&A Program, prepared by Tamboran B2 Pty Ltd, dated 26 April 2024
EMP document reference	TAM1-3
Regulated activity	EP98 is situated adjacent to the town of Daly Waters, to the west, south and east. EP117 is located approximately 17 km southwest and 60 km southeast of Daly Waters. Both EPs are situated within the Beetaloo Sub-basin of the Northern Territory. The EMP includes the following proposed regulated activities: <ul style="list-style-type: none"> • Civil construction of up to four exploration and appraisal well sites and associated infrastructure (access tracks, camp pads,

	<p>helipads, laydown yards, fence lines, firebreaks, water bore, gravel pits and all other ancillary infrastructure) as well as expansion of the existing Kyalla 117 N2 well site.</p> <ul style="list-style-type: none"> • Drilling, hydraulic fracture stimulation and well testing of up to fifteen wells (14 new, 1 approved under an existing EMP) at four new exploration locations, and the existing Kyalla 117 N2 well site. • Construction and operation of up to two hydrocarbon and wastewater gathering line networks between well sites (requiring ~9 ha of new disturbance). • Acquisition of 2D seismic data over approximately 77 km (requiring ~19 ha of new disturbance). • Decommissioning of all sites and associated infrastructure.
Public consultation	Public consultation on the EMP was undertaken in accordance with regulation 8A(1)(b) of the Regulations from 12 December 2023 to 9 January 2024.

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. Table 1 provides an overview of the key components of the regulated activity. The proposed work program is scheduled to take place from 2024 to 2028.

Table 1: Key components of the proposed work program

Component/aspect	Proposed
AAPA certificate	Applications for AAPA certificates have been lodged. The application numbers are 202402388 and 202402391.
Total area of EP98	10,300 km ² (1,030,000 ha)
Total area of EP117	6,399 km ² (639,900 ha)
Total area of surface disturbance	139.66 ha (including 119.26 ha of new clearing and 20.40 ha of existing approved clearing)
Seismic lines	77 km (including ~39 km along existing access tracks with no additional clearing and ~38 km (19.0ha) requiring 5 m wide seismic line clearing)
Access tracks	6 km (11.9 ha) newly constructed tracks 28.5 km (8.2 ha) upgrade to existing tracks
Well sites	4 new (34.5 ha) 1 expansion (3.8 ha)
Number of exploration wells	15 (4 wells per well pad) including 14 new wells and 1 previously approved well.
Groundwater extraction licence	GRF 10285 (175 ML/annum) The WEL is proposed to be increased to cover the future proposed exploration activities. This application is covered under the <i>Water Act 1992</i> and is separate to this EMP.
Groundwater usage	Up to 375 ML per annum, with ~1175 ML total
Groundwater extraction/monitoring bores	Up to 37 new bores
Gravel pits	1 new (5 ha)
Extended production testing	Up to 300 days per well (expected to be less than 90) Produced hydrocarbons (gas and condensate) will be flared
Camp	3 new ~75 person camp/s (3 ha)
Peak traffic movements	44 vehicles per day
Average operational (drilling, stimulation, well testing) traffic movements (first 6 months)	10-15 vehicles per day
Average traffic movements (for the balance)	3-4 vehicles per day
Volume of drilling mud and cuttings generated	3000 m ³ (per well site)
Flowback volume generated	10.8 ML (per well)
Flowback/wastewater volume predicted for treatment and offsite disposal	0.5 ML (per well site)

Component/aspect	Proposed
Enclosed wastewater tank capacity	63 ML (wet season) or 60.3 ML (dry season)
Open treatment tank capacity	3.9 ML (wet season) or 12.9 ML (dry season)
Greenhouse gas emissions ¹	~400,000 tCO ₂ -e

1.1 Activity Scope and Duration

This EMP proposes to undertake a series of exploration and appraisal activities over a period of five years on exploration titles on EP98 and EP117. These titles are located approximately 17 km southwest and 60 km southeast of Daly Waters respectively, on the Hayfield, Shenandoah, Shenandoah East and Beetaloo stations. The exploration and appraisal program proposed includes new activities as well as activities approved under three EMPs currently in-force. The activities approved under these in-force EMPs include civil construction of the Kyalla 117 well site and associated infrastructure and the drilling and hydraulic fracture stimulation of three wells at the Kyalla 117 well site. The activities proposed to be carried over from previous EMPs to the Beetaloo Basin Shenandoah South E&A Program are summarised in Table 2.

Table 2: Activities proposed to be carried over from previous EMPs to the Beetaloo Basin Shenandoah South E&A Program

EMP	Transferred activities
<i>Beetaloo Basin Kyalla 117 N2 Civil Construction EP117 (ORI1-1), approved 6 June 2019</i>	<ul style="list-style-type: none"> Ongoing operations; monitoring; maintenance; and rehabilitation of this site. Clearing of 0.25 ha of the lease pad (Regulation 22, 5 June 2023). Environmental performance standards and outcomes; ongoing operations; monitoring; maintenance; and rehabilitation (20.40 ha).
<i>Beetaloo Basin Kyalla drilling hydraulic fracture stimulation and well testing program EP117 N2 EMP (ORI3-2), approved 13 August 2019</i>	<ul style="list-style-type: none"> The well testing, suspension, maintenance, monitoring and decommissioning of the Kyalla 117 N2-1H well and ancillary activities. Ongoing operation, maintenance and monitoring of groundwater bores RN041136 and RN041137. Environmental performance standards and outcomes; ongoing operations; monitoring; maintenance; and rehabilitation.
<i>Beetaloo Sub-basin Kyalla 117 N2 Multi-well Drilling, Hydraulic Fracturing and Well Testing Program (ORI6-3), approved 22 February 2021</i>	<ul style="list-style-type: none"> The drilling, hydraulic fracture stimulation, well testing, suspension, maintenance, monitoring and decommissioning of the Shenandoah South 2H E&A well. Ongoing well testing, suspension, maintenance, monitoring and decommissioning of Shenandoah South 1H. Environmental performance standards and outcomes; ongoing operations; monitoring; maintenance; and rehabilitation.

New activities proposed in this EMP are to be carried out on existing disturbed areas, as well as undisturbed areas. The total area of surface disturbance included in the EMP is 139.66 ha, inclusive of 119.26 ha of new disturbance. Tamboran have provided detail to show how new disturbance is being minimised to the extent possible. Examples of disturbance minimisation include the use of existing access tracks and clearing avoidance measures in the seismic program, proposed use of shared facilities for camps and wastewater storage and co-location of rights-of-way for the gathering lines with existing access tracks. The following new activities are proposed in the Beetaloo Basin Shenandoah South E&A Program:

- Civil construction of up to four exploration and appraisal well sites and associated infrastructure (access tracks, camp pads, helipads, laydown yards, fence lines, firebreaks, water bore, gravel pits and all other ancillary infrastructure) as well as expansion of the

¹ Total predicted greenhouse gas emissions for the proposed work program prior to emission abatement and offsets

existing Kyalla 117 N2 well site. The EMP proposes the use of multi-well pads and shared facilities (camps, wastewater storage), which reduces clearing requirements.

- Drilling, hydraulic fracture stimulation and well testing of up to fifteen wells (14 new, 1 approved under an existing EMP) at four new exploration locations, and the existing Kyalla 117 N2 well site. The average well test duration is anticipated to be less than 90 days, with a maximum of 300 days.
- Construction and operation of up to two hydrocarbon and wastewater gathering line networks between well sites (requiring ~9 ha of new disturbance).
- Acquisition of 2D seismic data over approximately 77 km (requiring ~19 ha of new disturbance). Substantive sections of the seismic lines will be conducted on access tracks and disturbed areas to avoid clearing.
- Decommissioning of all sites and associated infrastructure.

The five year exploration and appraisal program is comprised of two civil works programs over the 2024 and 2025 dry seasons, and well drilling, hydraulic fracturing and testing programs in 2024, 2025, 2026 and 2027. Decommissioning and rehabilitation activities are proposed to commence in early 2028.

Sensitive receptors are located at a reasonable distance, being 15 km for the nearest homestead, 19 km for the nearest community and 7 km for the nearest mapped watercourse. The closest pastoralist bore is 9 km, which complies with the required separation distance of 1 km outlined in the Code of Practice for Onshore Petroleum Activities in the NT (the Code). The EMP shows an adequate consideration of potential impacts and risks of the regulated activity and proposes appropriate controls, in line with previously approved EMPs. Areas of particular interest in this EMP are the proposed use of seismic charges, reuse of wastewater, wastewater management and greenhouse gas emissions.

The EMP proposes the use of seismic charges to trial their use against the standard vibroseis methods (also proposed as part of this EMP), to determine whether this survey method could increase data quality, whilst lowering vegetation clearing requirements for future activities. Seismic acquisition using small dynamite charges involves the placement of small charges 15-20 m below the ground surface by light 4WD vehicle or equivalent. The explosives will be stored onsite in a portable magazine which adheres to Australian Standards. The charges can be placed around vegetation, which will significantly reduce clearing requirements, and the blast will be contained within the subsurface (i.e. no expulsion of earth from the surface). The charges will be offset from sensitive receptors (e.g. pipelines, active cattle yards, water bores, bitumen seal), guided by Australian Standards. It is noted there is a low risk that some charges may not detonate as expected, however, the charges contain biodegradation mechanisms which are designed to disable the effect of the charges which are at depth. To ensure all stakeholders are aware of this low risk, it is recommended a condition is set to obtain confirmation of this.

Groundwater usage is expected to be up to 375 ML per year. To reduce freshwater take and minimise the storage and disposal of wastewater, the EMP proposes the reuse of flowback fluid in the stimulation make up fluid. Flowback fluid is anticipated to make up approximately 30% of the stimulation fluid. An analysis of environmental impacts and risks is included in the EMP in accordance with the Code (clause C.7.1.1(b)). A chemical risk assessment was undertaken against observed contaminant levels in flowback fluid recorded during previous Tamboran's operations, which conclude that the health risk to workers is low. NORM levels in flowback fluid are significantly lower than the NT Radiation Protection Act trigger limit of 1 mSv/year. Compared to using freshwater only, the use of flowback fluid in the stimulation fluid make-up is anticipated to return water to the surface of higher salinity. Other contaminants in the flowback may increase in concentration as well, but these increases will be influenced by saturation levels and the salinity of the wastewater. The stimulation fluid make-up, as well as the flowback fluid will be monitored in accordance with the Code. This will allow quantification of these predicted changes in water quality.

The EMP proposes to construct gathering lines, to facilitate the transfer of high volumes of fluid and produced hydrocarbons safely and efficiently between well pads. Two gathering line networks will be constructed, one between Shenandoah S B and Shenandoah S C and the other between Kyalla 117 N2 and Shenandoah S2. Beneficial outcomes of installing and operating a gathering network include: reduced land clearing for storage tanks at each well site, increased capability and capacity for recycling and reuse of fluids between well sites and reduced wastewater disposal volumes and truck movements. Flow meters will be installed at each end of the gathering network to monitor flow volumes, with changes in flow rates used to identify potential leaks. Mass balance of fluid transferred to and from sites will be retained as per code of practice. Valve pits will be installed at 1 km intervals so if a leak is detected, flow can be shut off and the line repaired. Where a site is not operational, the gathering lines valves shall be shut in with all wastewater purged from the line. Operations of gathering lines will not be undertaken during conditions of bushfire or significant rainfall events which may damage gathering lines/ equipment. To ensure that the risk of an undetected spill is reduced to a level which is ALARP and acceptable, it is recommended a condition is set to require the interest holder to install a pressure monitoring system on the gathering lines, in addition to the mass balance assessment of pumped volumes.

The potential impacts and risks of the regulated activity have been identified and controls are reflected in the relevant environmental outcomes, performance standards and measurement criteria in the EMP. Mitigations outlined in the risk register are appropriate for the potential impacts identified and the EMP is clear on any uncertainty. Where appropriate, the NT EPA has also provided advice relating to Ministerial conditions at the end of this advice.

1.2 General compliance with the Code

The EMP demonstrates how the interest holder will comply with the relevant requirements of the Code when undertaking the regulated activity. Appendix M of the EMP demonstrates how the relevant sections of the Code have been applied to the mitigation and management of impacts and risks. The EMP also provides the following plans, which are compliant with the Code:

- Bushfire Management Plan (Appendix B)
- Weed Management Plan (Appendix C)
- Spill Management Plan (Appendix F)
- Wastewater Management Plan (Appendix G)
- Erosion and Sediment Control Plan (Appendix H)
- Methane Emissions Management Plan (Appendix I)
- Rehabilitation Plan (Appendix O)
- Emergency Response Plan (Appendix Q).

The current EMP shows an adequate consideration of potential impacts and risks of the regulated activity and proposes appropriate controls, consistent with the Code.

The level of detail and quality of information provided in the EMP is sufficient for the nature and scale of the regulated activity and to inform the evaluation and assessment of potential environmental impacts and risks, and meets the EMP approval criteria under regulation 9(1)(b) of the Regulations.

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

2.1 Decision-making principle

The EMP adequately assesses the environmental impacts and risks associated with the regulated activity and outlines appropriate avoidance and mitigation measures to avoid long-term impacts to the environment. The EMP includes additional mitigations associated with wet season activities, to mitigate potential impacts associated with erosion and sedimentation, off-site wastewater release, and transport of chemicals and wastewater. These controls have been assessed as adequate.

The interest holder has identified stakeholders and committed to ongoing stakeholder engagement in the EMP. The EMP was also made available for public comment from 12 December 2023 to 9 January 2024.

2.2 Precautionary principle

The NT EPA considers there is a low threat of serious or irreversible damage from the regulated activity. The interest holder's investigations into the physical, biological and cultural environment provide a satisfactory scientific basis to assess potential environmental impacts and risks, and to identify measures to avoid or minimise those impacts and risks and address scientific uncertainty and avoid the threat of serious or irreversible damage.

The risk assessment clearly demonstrates consideration of risk events in the context of the environment in which the regulated activity is conducted and its particular values and sensitivities, and the spatial extent and duration of the potential impact. Uncertainty in relation to the environmental features was assessed, with no areas of environmental uncertainty identified.

The precautionary principle has been applied by Tamboran during the assessment on threatened fauna, as records of species may be limited in remote areas. Some species have been assessed as possibly occurring even though their primary habitat is not found within the proposed sites or access tracks. These include species that are associated with ephemeral wetlands, low lying areas that may be seasonally inundated and creeks. Controls have been implemented, by the interest holder, reduce the risks to these species from the activities to a level that is as low as reasonably practicable and acceptable.

The risks of conducting the activity over the wet season are well understood, and the EMP demonstrates adherence to the Code. The EMP includes the assessment of impacts and risks for wet season operations and management strategies, including measures such as halting activities if there is significant rainfall and the inspection of erosion and sediment control measures.

The EMP complies with the Code requirement to track water use. Groundwater use will be metered with continuous flow meters, and recorded weekly to ensure that extraction does not exceed the water take volumes.

The groundwater monitoring program proposed to be undertaken is beyond the requirements of the Code, and includes the collection of groundwater data from pastoralist bores within 10 km of an exploration well. The groundwater monitoring program includes continuous groundwater level logging before, during and 1 month after stimulation. As a precautionary measure, so that the Department receives timely confirmation of aquifer protection during hydraulic stimulation, the NT EPA recommends a condition to undertake pressure monitoring at intervals and for a duration specified by the Department, with data submitted to the Department in a timely manner.

The NT EPA is of the view that 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 existing and the presence of a satisfactory scientific basis to assess potential impacts and risks. In addition, the existing wide environmental monitoring commitments contained in the EMP are compliant with the Code and provide measureable performance measures to ensure that the environmental outcomes are met. The EMP commits to the preparation and submission of an annual environmental performance report, however the NT EPA recommends a Ministerial condition outlining the timing and form of the submission.

2.3 Principle of evidence-based decision-making

A good understanding of the existing environment is demonstrated through a combination of desktop assessment and field-based survey of the proposed activity locations. The field survey was undertaken by AECOM in March and April 2023. The assessment also considered data from previous assessments undertaken in 2004, 2006, 2010, 2014, 2016, 2018 and 2021 as well as information from the Strategic Regional Environmental and Baseline Assessment and associated data catalogue. These assessments have informed the assessment of risk to listed species and their

habitats and assisted in selection of sites for conduct of the regulated activity such that potential impacts may be minimised.

The EMP includes a detailed risk assessment related to chemical handling, storage and use. The chemical risk assessment in Appendix E demonstrates the risk of impact to the environment can be managed. The proposed management measures for wastewater are satisfactory, with secondary containment proposed to be used as well as satisfactory spill response procedures. As a precautionary step the NT EPA recommends a Ministerial condition for this activity relating to the recording of spills.

The EMP includes an assessment of traffic impacts on other road users and concludes traffic impacts are manageable, based on the staging of the regulated activity, the capacity of the Stuart Highway and the short duration of peak traffic periods.

The proposed environmental outcomes are likely to be achieved based on the best available information on the environment in which the regulated activity will be conducted. The studies undertaken by the interest holder to inform the EMP affords the interest holder with a detailed and reliable knowledge of the potential environmental impacts and risks and the most appropriate measures for mitigation of those impacts and risks.

The NT EPA is of the view that the evidence-based decision-making principle has been considered in assessing the regulated activity and that in the circumstances, decisions can be based on best available evidence that is relevant and reliable. As data availability on the composition of geogenic compounds in the Beetaloo Sub-basin is scarce in the current stage of exploration, the NT EPA recommends the interest holder be required to undertake a risk assessment of the flowback fluid returned to surface.

2.4 Principle of intergenerational and intra-generational equity

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

Protection of cultural interests is achieved through compliance with the requirements of Authority Certificate/s issued by the Aboriginal Areas Protection Authority under the *Northern Territory Aboriginal Sacred Sites Act 1989* (NT) and an archaeological assessment of disturbance areas to avoid archaeological heritage impacts.

The proposed reuse of flowback fluid will significantly reduce groundwater take for the proposed activities, as well as reduce total wastewater volume for offsite disposal. Reduced wastewater volume shortens the treatment time on-site and reduces the required storage capacity, with less tanks being required for wastewater storage, tank pad sizes (and therefore the clearing footprint) may be reduced.

Progressive rehabilitation of the seismic lines will commence after data acquisition on each line. This will reduce exposed soils and minimise runoff in first flush events, leading to better long term rehabilitation outcomes. Rehabilitation is expected to commence within two to six weeks of seismic line acquisition, and before the onset of the wet season.

The total (unabated) greenhouse gas (GHG) emissions predicted to be generated by the regulated activity are approximately 400,000 tCO₂-e. The cumulative emissions of the interest holder is predicted to exceed the annual threshold of 100,000 tCO₂-e under the Greenhouse Gas Emissions Management for New and Expanding Large Emitters Policy (Large Emitters Policy) in the 2025 financial year, and a Greenhouse Gas Abatement Plan has been developed that commits to an offsetting regime that achieves net zero by 2050. The total GHG emissions for the life of the project, including offsets and abatements required under the Commonwealth Safeguard Mechanism and committed to in the Greenhouse Gas Abatement Plan are approximately 177,000 tCO₂-e, based on the predicted GHG emission totals provided in the EMP.

The NT EPA considers that environmental values will be protected in the short and long term from the activities outlined in the EMP 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

Exploration activities are necessary to enable commercial appraisal of resources. In the absence of reliable data regarding the shale resource, exploration will take a number of years to complete, in order to assess the viability of the resource prior to production. The use of multi-well pads (4 wells per pad) allows this assessment to take place under a reduced clearing footprint. The proposed trial with seismic charges will further reduce the clearing footprint, if demonstrated to be a viable alternative to the conventional vibroseis methodology.

Cumulative impacts of groundwater extraction have been assessed. The interest holder has a groundwater extraction licence GRF10285 with a maximum water entitlement of 175 ML per annum from the Gum Ridge Formation. The anticipated water demand for this regulated activity ranges from 189 ML in 2027 to 375 ML in 2025, which is more than the interest holder's current maximum water entitlement. Tamboran are applying to increase the water extraction licence to cover the future proposed exploration activities. This application is covered under the *Water Act 1992* and is separate to this EMP. The sustainability of the increase in groundwater take will be assessed as part of the application under the *Water Act 1992*.

The proposed offsetting regime of GHG emissions is consistent with the NT Government's expectations for new large emitting projects to reduce and manage emissions in a way that enables development to occur while contributing to the Territory's emissions target of net zero greenhouse gas emissions by 2050. To support the NT Government's commitment, the NT EPA recommends the interest holder be required to provide a revised Greenhouse Gas Abatement Plan annually, to specify actual emissions, the quantum of emissions to be offset, and to provide a demonstration of how offsetting commitments have been met.

As emissions in the EMP are estimates, a Ministerial condition is recommended that requires the interest holder to provide an annual emission report to the Department that summarises GHG emissions reported under the Australian Government's *National Greenhouse and Energy Reporting Act 2007* versus the predicted emissions in the EMP.

The NT EPA is of the view that the sustainable use principle has been considered in assessing the regulated activity.

2.6 Principle of conservation of biological diversity and ecological integrity

The proposed location for the regulated activity does not include groundwater dependent ecosystems; nor is it within proximity to a declared ecological community under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999*.

The regulated activity poses a low risk to the ecosystem within the Stuart Plateau bioregion. Given the relatively small area of impact (approximately 140 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 listed species. No critical habitat for listed fauna was identified in the project area, but 16 listed species potentially occur in the wider landscape. 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 listed species.

Avoidance and mitigation measures identified in the EMP are adequate to reduce risks from, for example, vehicle-strike, dust, erosion and/or spills to ALARP and acceptable levels, in relation to potential impacts on biodiversity.

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. The EMP outlines measures to minimise impacts on affected environmental values, including the management

of threatening processes such as erosion, weeds and fire. The proposed management plans are consistent with the requirements of the Code, the NT Land Clearing Guidelines, and the Weed Management Planning Guideline: Onshore Petroleum Projects. Specific precautions to ensure interaction with wildlife is avoided are included in the EMP. These include inspections for fauna presence, speed limits on access roads, above ground tanks with raised walls, and daily checks of infrastructure.

The NT EPA considers that implementation of, and compliance with, the EMP will ensure the conservation of biological diversity and ecological integrity is not impacted by the regulated activity.

2.7 Principle of improved valuation, pricing and incentive mechanisms

The interest holder is 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 disposal of waste, commercial purchase of groundwater, and progressive rehabilitation of all disturbed areas to an acceptable standard, are at the cost of the interest holder. The interest holder is required to provide an environmental security, that may be accessed to remediate disturbance in the event an interest holder does not or cannot fulfil remediation and rehabilitation requirements.

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. Environmental impacts and risks reduced to a level that is as low as reasonably practicable (ALARP) and acceptable (regulation 9(1)(c))

The interest holder commits to identified measures to avoid or minimise impacts on environmental values, informed by a baseline studies, desktop assessments and data derived from previous operations in the area. The EMP systematically identifies and assesses environmental impacts and risks associated with the regulated activity. The key potential environmental impacts and risks considered in the EMP are loss in long-term soil productivity and viability due to soil erosion from cleared areas, impact to listed threatened habitats and listed threatened flora and fauna, including non-listed fauna and livestock through surface activities, disturbance of sacred sites or culturally sensitive areas and decline in environmental values of areas used for cultural purposes through the accidental ignition of fire by site activities, reduction in agriculture productivity through the introduction and spread of weeds in the area or accidental ignition from surface activities, and increased nuisance from dust emissions associated with the activities.

The EMP demonstrates why the controls to be implemented are considered ALARP and acceptable. Of the 99 environmental risks identified by the interest holder, 87 are considered 'low' risk and therefore are considered to manage impacts and risks to ALARP and acceptable levels. The remaining 12 risks are considered 'medium' and the interest holder has included mitigations that will be implemented such that the risks will therefore be managed at levels that are ALARP and acceptable. Specifically:

1. Loss in long-term soil productivity and viability due to soil erosion from cleared areas: The interest holder has committed to implementing controls to manage the risk of soil erosion from cleared areas. These controls include the implementation and maintenance of an Erosion and Sediment Control Plan (Appendix H), minimising new land clearing requirements and avoiding clearing where slopes are greater than 2%. The moderate risk ranking was informed by a consequence rating of 'minor' and the likelihood of the consequence occurring as 'unlikely', with the proposed controls in place.
2. Impact to listed threatened habitats and listed threatened flora and fauna, including non-listed fauna and livestock through surface activities: The interest holder identified five risk scenarios: accidental ignition of fire from exploration activities, accidental ignition of fire during 2D seismic acquisition and general access, introduction and spread of weeds in the area, introduction and

spread of weeds in the area during 2D seismic, and poor rehabilitation of the 2D seismic lines. Weed management controls are identified in the interest holder's weed management plan (Appendix C). To prevent the spread of weeds to the project area, all equipment and vehicles are to be washed-down and have a Biosecurity Declaration Certificate prior to access. The EMP also includes provisions for regular weed monitoring and treatment. A bushfire management plan (Appendix B) has been prepared and will be implemented to prevent and respond to bushfires. The plan includes details on the controls to be implemented to prevent accidental ignition of fire from exploration activities, including construction of fire breaks, restrictions on activities during periods of total fire ban, annual fire preparedness assurance activities, monitoring, and fire hazard reduction activities. Site specific rehabilitation plans (Appendix O) have been developed, including for the 2D seismic acquisition activity. Rehabilitation monitoring will be undertaken, with controls in place should additional rehabilitation work be required. The moderate risk ranking was informed by a consequence rating of 'serious' for accidental ignition of fire from exploration activities and 2D seismic acquisition, 'moderate' for the introduction and spread of weeds in the area, including 2D seismic acquisition, and 'minor' for poor rehabilitation of the 2D seismic lines. The risk ranking was also informed by the likelihood of the consequence occurring as 'highly unlikely' for accidental ignition of fire from exploration activities and 2D seismic acquisition, 'unlikely' for the introduction and spread of weeds in the area, including 2D seismic acquisition, and 'possible' for poor rehabilitation of the 2D seismic lines, with the proposed controls in place.

3. Disturbance of sacred site or culturally sensitive area and decline in environmental value of area used for cultural purposes through the accidental ignition of fire by site activities, or accidental ignition during 2D seismic activities. The interest holder has committed to implementing controls to manage these risk scenarios, these have been previously described in risk number 4. The moderate risk ranking was informed by a consequence rating of 'serious' for accidental ignition of fire from exploration activities and accidental ignition during 2D seismic activities. The risk ranking was also informed by the likelihood of the consequence occurring as 'highly unlikely' for accidental ignition of fire from exploration activities and accidental ignition during 2D seismic activities, with the proposed controls in place.
4. Reduction in land productivity through the introduction and spread of weeds in the area or accidental ignition from surface activities: The interest holder has committed to implementing controls to manage these risk scenarios. Controls to prevent the spread of weeds and accidental ignition of fire by site activities, including 2D seismic activities, are included in the description of risk number 4. The moderate risk ranking was informed by a consequence rating of 'moderate' for the introduction and spread of weeds in the area and 'serious' for accidental ignition of a bushfire by site activities. The risk ranking was also informed by the likelihood of the consequence occurring as 'unlikely' for the introduction and spread of weeds in the area and 'highly unlikely' for the accidental ignition of a bushfire by site activities, with the proposed controls in place.
5. Increased nuisance from dust emissions associated with the activities: The interest holder has committed to implementing controls to manage these risk scenarios. Water trucks will be used to decrease dust emissions, access tracks will be maintained, and routine site inspections to identify and rectify excessive dust generation will be carried out. Controls for accidental ignition of fire by site activities, including 2D seismic activities are included in the description of risk number 4. The moderate risk ranking was informed by a consequence rating of 'minor' for dust generation from civil activities, drilling operations, well testing and 2D seismic activities, and 'serious' for the accidental ignition of a bushfire by site activities. The risk ranking was also informed by the likelihood of the consequence occurring as 'likely' for dust generation from civil activities, drilling operations, well testing and 2D seismic activities, and 'highly unlikely' for the accidental ignition of a bushfire by site activities.

The EMP also considers cumulative impacts related to groundwater use, land clearing, GHG emissions, surface water quality, amenity, terrestrial ecology and traffic and concludes these have been managed to ALARP and acceptable levels.

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, and the nature, scale and location of the regulated activity. The NT EPA considers that the environmental impacts and risks will be reduced to a level that is ALARP and acceptable,

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

4. Summary of monitoring and inspections

Table 3 provides a summary of the monitoring and inspections committed to in the EMP. These programs are used to meet prescribed requirements and to confirm the effectiveness of mitigations committed to.

Table 3: Monitoring and inspections relevant to the scope of the regulated activity

Aspect	Records/Reports & Type of Monitoring/Inspection		Frequency
Flora and fauna	Record(s)	Fauna - routine inspections of wastewater tanks and sumps	Weekly
		Large tree clearing log	As required
		Survey and spatial data collected confirms disturbance levels are within approved limits and areas	As required
		Pre-clearance surveys documenting evidence of falcon nesting sites	Prior to land clearing activities
Erosion and sediment control	Record(s)	Visual inspection of infrastructure and erosion and sediment controls	Pre- and post-wet season
		Civil construction daily reports	Daily
	Report(s)	Annual environment performance report	Annually
Surface water	Record(s)	Records of stormwater release	As required
		Records of low point drain release	As required
Groundwater	Record(s)	Monitoring to detect changes in groundwater resulting from drilling and stimulation activities	Quarterly and as per the Code, based on the parameter
		Groundwater take	Continuous flow meter
	Report(s)	Well completion report and/or Well barrier verification report	As required
		Groundwater monitoring results	Within 60 days of each groundwater monitoring event
		Interpretive groundwater report	Annually
Emissions	Record(s)	Methane emission monitoring program 1. To identify and remediate gas leaks 2. To monitor combustion efficiency of flare	1. 6 monthly 2. Daily
		Gas flow volumes and separator operation log	Daily
		Leaks repairs and maintenance	As required
	Report(s)	Emissions related data (fuel use, flaring volumes, venting volumes, wastewater volumes etc.) reported in accordance with NGERS requirements	As required
Audit report on emissions to DEPWS		Annually	
Bushfire	Record(s)	Incidents of bushfire caused by Tamboran's activities	As required

Aspect	Records/Reports & Type of Monitoring/Inspection		Frequency
		Fire mapping to monitor changes to fire frequency in the area	Annually
Weeds	Record(s)	Weed monitoring completed pre and post wet season on all disturbed areas	Post-wet season
	Report(s)	Annual weed monitoring and management report	Annually
Chemicals	Record(s)	Chemical storage secondary containment inspections	Daily during the wet season. Weekly during the dry season
		Incident records with spill location, volumes and clean-up information, including leak locations	As required
Wastes	Record(s)	Monitoring of stormwater releases from the sediment basin release point	Prior to release and at least every 12 hours during continuous discharges
		Monitoring of low point drains to confirm water is suitable for release	Prior to each release
		Monitor impact to surrounding soils	Weekly
		Monitoring of hydrotesting water to confirm suitability for release	Each activity
	Record(s)	Characterise the quality of drill cuttings, fluids and muds to determine disposal options	Prior to disposal
	Report(s)	Certification from a suitably qualified third party that drill cuttings, fluids and muds proposed to be disposed of on-site are of acceptable quality for disposal to land by the proposed method and that environmental harm will not result from the proposed disposal	Prior to disposal
Drilling/completion fluids	Record(s)	Wastewater volumes within the drill sumps	Daily during operations and wet season, weekly during the dry season post drilling
	Report(s)	Records of wastewater tank/ sump level and volume measurements retained	
Hydraulic fracturing fluids	Record(s)	Characterise stimulation fluid <ul style="list-style-type: none"> • Field chemistry • Laboratory analysis 	One for each fluid system used during injection

Aspect	Records/Reports & Type of Monitoring/Inspection		Frequency
Flowback fluid	Record(s)	Characterise flowback quality	Field chemistry: Daily during the first four- weeks and weekly thereafter Analytical suite: Weekly for the first 12 weeks of flowback and monthly thereafter
		Flowback storage characterization	6 monthly
		Source water characterisation	Prior to stimulation
		Wastewater tank liner integrity	Upon alarm
		Wastewater tank integrity	Weekly
		Flowback wastewater levels	Continuously
		Liner and gathering line maintenance and repairs	As required
		Wastewater tank secondary containment leak monitoring including leak alarms and leak alarm responses	Daily
	Report(s)	Inspections completed during wastewater evaporation confirming no drift outside of the wastewater tank	Daily
		Wastewater tracking and storage forecasting	Weekly
Gathering lines	Record(s)	Report about flowback fluid and produced water	Within 6 months of flowback commencing
		Leak detection inspections	Monthly for buried gathering lines (when in operation); weekly for above ground lines (when in operation)
		Gathering line maintenance and repairs	As required
Cultural heritage	Record(s)	Gathering line leak detection	Continual when in operation
		Non-compliances with AAPA certificate conditions	As required
		Breaches of native title holders' exploration agreements	As required
		Records of on country meetings	Annually
		Records of native title holders attending disturbance activities.	As required
	Records of environmental programs completed by indigenous contractors retained.	As required	
Report(s)	Work program update report	Annually	
Rehabilitation	Record(s)	Inspect disturbed seismic lines	Daily during seismic activity and reinstatement

Aspect	Records/Reports & Type of Monitoring/Inspection		Frequency
		Inspection of all rehabilitated areas, including well pads, seismic lines, access tracks, gravel pits and camp pads	Annually
	Report(s)	Rehabilitation monitoring report	Annual
Community	Record(s)	In-vehicle monitoring systems to monitor speed limits, seat belt usage, harsh breaking and acceleration, and fatigue	Continuous (all vehicles)
		Community complaints and actions completed	As required
		Project expenditure data showing addressable spend on NT businesses	As required
Hydrocarbons	Record(s)	Characterise produced gas	Monthly
Seismicity	Record(s)	Identify induced seismic events caused by hydraulic fracturing using seismometers installed adjacent to selected well sites	2 months before and 2 months after hydraulic fracturing

5. Considerations under the *Environment Protection Act 2019*

In accordance with section 48 of the *Environment Protection Act 2019* (NT) (EP Act), a proponent must refer to the NT EPA, a proposed action (section 5) that has the potential to have a significant impact (sections 10 and 11) on the environment. Alternatively, in accordance with section 53(1) the NT EPA may provide a written notice (a call-in notice) to the proponent requesting the proponent refer the action, if it is believed on reasonable grounds that a proponent is taking an action that should be referred to the NT EPA for assessment.

The NT EPA has had regard to sections 10 and 11 of the EP Act and its published guidance, Referring a Proposal to the NT EPA, and has determined that:

- The industry type or activity proposed is not inherently hazardous, nor is it likely to give rise to multiple or unacceptable risks or impacts on the environment, with the proposed controls implemented.
- The location of the regulated activity has avoided impacts to sensitive environmental values and receptors to the greatest extent possible and where unable to be avoided, any potential impacts have been mitigated so they would not be significant.
- At no stage of its lifecycle, including post closure, would the activity, on its own or cumulatively with other activities, have a significant impact on the environment.

On this basis, the NT EPA has elected to not require the proponent refer the action.

6. Relevant matters raised through public submissions

The EMP was made available for public comment for 28 days from the 12 December 2023 to the 9 January 2024. A total of 30 public submissions were received with none of the submissions being proforma submissions originating from advocacy websites. A total of 25 submissions (83%) originated in the NT, noting 2 submissions (7%) did not identify their origin. There were 29 unique submissions made.

The issues raised by the community were considered by the NT EPA. Several submissions raised substantially similar matters as those addressed through the Scientific Inquiry into Hydraulic Fracturing in the Northern Territory (HFI) and subsequent implementation of the 135 HFI recommendations; however, new matters were raised as well, which have informed modification of the EMP. A summary of the relevant matters raised in the submissions, and a response to those matters, is provided in Table 4.

Table 4: Consideration of relevant matters raised in public submissions

Theme	Issues raised	Response
Chemicals	<ul style="list-style-type: none"> • Human health risk assessment • Impact pathways • Impact of chemicals and mixtures of chemicals on human health and the environment • Chemicals storage • Disposal of drilling muds • Remoteness and emergency response 	<p>The human health risk assessment of proposed chemicals was prepared by an independent third party, in accordance with regulation 4A, and considered both acute and chronic toxicity.</p> <p>The human health risk assessment was amended based on matters raised in relation to identification of chemicals, exposure pathways and classification of chemicals. It is noted there is no complete exposure pathway for the community from petroleum activities, based on the distance to the nearest public receptors, the radial extent of a worst-case spill scenario and the controls in place to avoid a loss of containment event, including during flood conditions.</p> <p>Human health risk assessments required under regulations 37A(2A) and 37B(2A), and wastewater testing to inform environmental risks as required by the Code, occur after the EMP is approved.</p> <p>The risk assessment demonstrates all chemicals were considered low concern when standard chemical handling, storage and disposal practices were applied. None of the chemicals proposed for use in drilling and hydraulic fracturing were identified to be both persistent and bio-accumulative.</p> <p>The risk assessment addresses additional social impacts, human health impacts and cultural impacts that could arise from the activities proposed in the EMP. The EMP recognises requirements under work, health and safety legislation, which addresses safety of workers.</p> <p>The EMP includes information on potential flood impacts and emergency response and on-site disposal of drilling muds.</p>
Climate change	<ul style="list-style-type: none"> • Impact of greenhouse gas emissions • Scope 3 emissions • Cumulative greenhouse gas emissions • Greenhouse Gas Abatement Plan (GGAP) • Emissions calculations • Flaring and venting • Offsetting • Leak detection • Commonwealth Safeguard Mechanism • Ambient Air Quality National Environment Protection Measure (NEPM) • Air quality 	<p>A GGAP has been developed for the regulated activities under this EMP consistent with the Large Emitters Policy requirements. Emissions have been calculated in accordance with the National Greenhouse and Energy Reporting Scheme (NGERS).</p> <p>The EMP considers fugitive emissions, provides detail on compliance with NGERS calculation methods and assumptions, considers potential impacts to climate from cumulative greenhouse gas emissions and emissions reduction methods.</p> <p>The EMP itself demonstrates a commitment to minimise emissions to ALARP and acceptable levels and offset residual emissions unable to be avoided or mitigated.</p> <p>The EMP is not required to account for emissions that may result from a full production scenario, as that is not the subject of regulated activities proposed in the EMP. Cumulative impacts from a full production scenario will be required to be considered in future approvals for production activities, which will be informed by the outcomes from the current proposed activities.</p> <p>There is no proposal under the EMP to use carbon, capture and storage as a mechanism for emissions reduction.</p>
Flora and fauna (environment)	<ul style="list-style-type: none"> • Baseline ecological surveys and extent of Strategic Regional Environmental and Baseline Assessment (SREBA) • Impacts on birds and amphibians from wastewater • Feeding areas for granivorous birds • Traditional food sources 	<p>The EMP demonstrates an adequate understanding of the listed species and sensitive receptors that may occur in the area of the regulated activities, informed by a range of previous ecological assessments across the interests, targeted assessments of areas of proposed ground disturbance, sufficient to understand the potential impacts of the proposed regulated activity, and desktop database searches, including use of SREBA data. As the area of suitable habitat proposed to be cleared is very small compared to the area of remaining suitable habitat for the identified listed species, it is considered unlikely that the proposed regulated activities pose a significant risk to the listed species, with implementation of the controls proposed. The EMP commits to avoiding clearing of hollow-bearing trees that provide nesting sites. Impacts to stygofauna from chemicals is avoided through compliance with requirements of the Code. Interest holders are required to use only drilling fluids that are non-toxic while drilling through aquifers to avoid impacts to groundwater.</p>

	<ul style="list-style-type: none"> • Impacts on groundwater dependent ecosystems, including stygofauna • Chemical exposure pathways for fauna • Pollution of country • Habitat fragmentation and introduction of weeds • Cumulative impacts, including from emissions and groundwater use • Contamination of aquifers • Spread of weeds • Rehabilitation contingency 	<p>Hydraulic fracturing doesn't interact with shallow groundwater, where stygofauna are likely to be present.</p> <p>The EMP demonstrates the proposed activities were informed by SREBA data and clearly indicates the contribution of past activities to cumulative impacts. The EMP considers the cumulative effect of land clearing from this and other petroleum activities, and concludes that 0.0227% of the region surrounding the EPs has been cleared for petroleum exploration to date. The proposed activity falls within the Georgina Wiso Water Allocation Plan 2023-2031,² gazetted 10 November 2023. The Plan estimates a sustainable annual yield of 186,154 ML for the Georgina Basin, against a storage capacity of 660,000,000 ML. Of this, 8,000 ML may be allocated to petroleum activities per annum. When considered against all other current users, The total extraction for all users of the Gum Ridge aquifer is currently less than 2,000 ML per annum, which is well below the sustainable annual use. The proposed increase of the current water extraction licence to 450 ML/annum is not considered significant. Cumulative GHG emissions are assessed, and the EMP concludes that publically available data shows forecast emissions for the four year program across all approved EMPs emissions to date represent 2.5% of the total 2022 NT emissions.</p> <p>The EMP considers the full range of listed species which may be present, based on advice from the Flora and Fauna Division.</p> <p>No wastewater may be stored in open tanks, unless it is being treated for reuse or disposal. Where wastewater is placed into open tanks for treatment, these tanks have vertical sides, which prevents access by ground-dwelling fauna, and therefore there is unlikely to be any impact from wastewater treatment. Similar operations conducted in the NT and other jurisdictions have found impacts to birdlife from open cuttings pit are considered low due to the saline nature of the water not being attractive or injurious to bird species. Open drill cutting pits may be accessed by fauna and the interest holder has included in the EMP a trigger and proposed actions should observations of impact on fauna from open drill cutting pits be detected.</p> <p>All land disturbance from onshore petroleum activities is required to be rehabilitated, thereby minimising long term habitat fragmentation. Progressive rehabilitation has been committed to and the EMP includes contingencies should natural regeneration of areas for rehabilitation does not progress adequately.</p> <p>Compliance with the best practice measures for prevention of pollution from onshore petroleum activities provided in the Code act to ensure spills are prevented, groundwater is protected, and wastewater storage, treatment, transport and disposal are subject to stringent controls. Should contamination occur remediation must be undertaken and the cost borne by the interest holder.</p> <p>Weed management was informed by baseline weed assessments and the EMP commits to ongoing application of vehicle hygiene measures and annual weed assessment and control activities. All weed management activities are also subject to oversight of a dedicated government Petroleum Regional Weeds Officer, who is also an authorised inspector under the <i>Weeds Management Act 2001</i>.</p> <p>The modified EMP includes amendments which more clearly explain aquifer protection considerations in well design.</p> <p>Expansion of exposure pathways for fauna and chemicals is addressed under 'Chemicals' above.</p>
Social and Cultural	<ul style="list-style-type: none"> • Consent for onshore petroleum activities • Authority Certificate • Stakeholder engagement • Impacts to cultural values • Public comment period 	<p>The EMP includes a stakeholder engagement log, which demonstrates that the interest holder has engaged with a range of stakeholders including direct engagement with the relevant leaseholders, Aboriginal stakeholders and the Northern Land Council, as an agent or representative of Aboriginal stakeholders.</p> <p>The interest holder has elected to not progress activities at Shenandoah North B to ensure protection of culturally significant areas identified near this location. The EMP may not be approved without a valid Authority Certificate relevant to the location of the proposed regulated activities.</p> <p>Public submissions raised concerns about whether a 28 day comment period over the Christmas and New Year period was sufficient for obtaining public feedback. The 28-day public comment period is a legislated period. Similarly, the Regulations require an EMP submitted for approval to be advertised within 14 days of receipt. The NT EPA notes that a subscription service has been established, which allows for all interested</p>

² https://nt.gov.au/__data/assets/pdf_file/0007/1284829/georgina-wiso-water-allocation-plan-2023-2031.pdf

		parties to receive a notice immediately an EMP is made available for public comment, and the website includes additional contact details for any member of the public having difficulty accessing an EMP or providing submissions.
Water	<ul style="list-style-type: none"> • Groundwater over-extraction • Baseline groundwater monitoring • Contamination of Groundwater • Downstream impacts and flooding • Hydrological connections between aquifers • Risk of groundwater contamination related to faults • Drawdown impacts 	<p>The proposed groundwater use is within the allocated sustainable yield for the Georgina Wiso Basin and the risk of impacts to groundwater availability for other users is considered very low. The interest holder has also committed to reuse flowback fluid collected to reduce the overall take of groundwater.</p> <p>The interest holder has incorporated the outcomes of SREBA groundwater studies into the assessment of the potential for impacts to groundwater for the proposed activities. Some submissions raised concern about methane having been recorded during SREBA in Bitter Springs and the link to petroleum activities. Bitter Springs is a well-known natural source of methane emissions³ and presence of dissolved methane in sedimentary basins is not considered unusual.⁴ A study of the hydrogeology of the Beetaloo also noted that the measured concentrations of dissolved methane in groundwater of the Beetaloo Sub-basin is low, which indicates limited influence from vertical mixing.⁵</p> <p>The EMP meets groundwater monitoring requirements and has accumulated a substantive body of groundwater monitoring data which informs potential impacts to groundwater quality and quantity, including risks to surface water and groundwater in relation to naturally occurring faults.</p> <p>The potential for downstream impacts to the Newcastle Creek catchment, which feeds into Lake Woods, have been considered. Appendix E of the EMP includes an assessment of the potential for a spill to spread and infiltrate to groundwater, and considered a range of receptors including Lake Woods, Newcastle Creek and Aboriginal protected areas. Modelling of a 1 ML release event (greater than the largest possible amount of wastewater that could be released by a flowline) concluded that an area of up to 549 m radius could be affected. It was also concluded that it would take approximately 2,000 days to infiltrate through to 50 m below ground level in siltstone, or 200 days in fractured limestone. The EMP includes a spill management plan for spills of hazardous materials, and primary and secondary containment for all potentially hazardous materials stored. The risk of a major spill causing offsite contamination of surface waters or groundwater is considered unlikely. The nearest sensitive receptor is reported as being 4 km away (a pastoral bore), and notably, the nearest surface water stream is 8.5 km from the location of a well proposed to be hydraulically fractured.</p>
Wastewater	<ul style="list-style-type: none"> • Wastewater disposal • Open wastewater treatment ponds • Management of stormwater and sediment basins • Use of flowlines • Wet weather contingency plan • Discharge of wastewater to surface water • Monitoring of freeboard and emergency response 	<p>Storage tanks and pits are designed and operated to prevent overtopping due to rainfall and drill cutting sumps include sufficient freeboard to accommodate in excess of the anticipated rainfall based on a 1:1000-year Average Recurrence Interval (ARI) for the duration of the regulated activity. The risk of overtopping is considered unlikely. The approach for management of wastewater from hydraulic fracturing activities in the EMP is compliant with the mandatory requirements of the Code, which allow for use of open tanks for the purpose of evaporation and recycling of wastewater where feasible to do so. All wastewater movements are required to be tracked, in accordance with the Regulations, and transporters are subject to licensing requirements specific to the type of wastewater being transported, in accordance with the <i>Waste Management and Pollution Control Act 1998</i>. The proposed approach to monitoring freeboard is also consistent with the mandatory requirements of the Code, such that the risk of an overtopping event is managed to ALARP and acceptable levels.</p> <p>Proposed management of stormwater is consistent with the requirements of the Code, in that only stormwater that has not had interaction with chemicals or wastewater may be allowed to leave a well site. The interest holder has established a system of testing uncontaminated stormwater retained in sediment basins prior to release, to confirm suitability for discharge.</p>

³ <https://gisera.csiro.au/wp-content/uploads/2019/09/GHG5-Milestone-4-Final-Report.pdf>;
<https://gisera.csiro.au/wp-content/uploads/2019/05/GHG5-Milestone-1-Dry-Season-Survey.pdf>

⁴ https://www.bioregionalassessments.gov.au/sites/default/files/gba-bee-stage2-appendix_hydrogeology_final.pdf

⁵ https://www.bioregionalassessments.gov.au/sites/default/files/gba-bee-stage2-appendix_hydrogeology_final.pdf

		Use of gathering lines to transport wastewater and other substances is a widely accepted practice in Australia and elsewhere, and is strongly regulated by specific standards to ensure integrity of the flowlines. The EMP includes information in relation to the construction, operation and abandonment of gathering lines.
Regulation and compliance	<ul style="list-style-type: none"> • Referral under the <i>Environment Protection Act 2019</i> (NT) (EP Act) and the <i>Environment Protection and Biodiversity Conservation Act 1999</i> (Cth) (EPBC Act) • Application of precautionary principle of ecologically sustainable development • Stakeholder engagement • Sand mining • Authority Certificate • Interest holder compliance • Compliance with the Code • ALARP and acceptable levels • Commonwealth Safeguard Mechanism 	<p>As recommended by NT EPA referral guidance and as allowed for in the legislation, the interest holder has undertaken a self-assessment as allowed for in the legislation as to whether the EMP should be referred for assessment under the EP Act and the Commonwealth for assessment under the EPBC Act, and concluded a referral is not required. The EMP is considered by the NT EPA, as is reflected by this Advice, and was subject to review by a full range of NT government agencies, including by specialists in environmental impact assessment, fauna and flora, water quality and quantity, land management, bushfire, weeds, traffic, public health and social impacts.</p> <p>The modified EMP is consistent with the regulatory framework established by HFI recommendations implemented for exploration activities. Regulated activities are only permitted if conducted in accordance with the applicable legislative framework. The legislative framework allows for an Authority Certificate to be issued at any time, noting an EMP may not be approved in the absence of a certificate. Authority Certificates are not included in public facing information, due to the confidential nature of the information within them. Extraction of groundwater is governed under the provisions of the <i>Water Act 1992</i>, which includes consideration of sustainable use of groundwater resources.</p> <p>While inclusion of possible future activities in an EMP improves transparency, it may also create confusion as to the actual scope of the EMP. Therefore the EMP was updated to remove reference to beneficial reuse of appraisal gas and any other activities which are discussed that are not proposed under the current EMP.</p> <p>The environmental performance of all interest holders is made public, through a transparent process of publishing annual performance reports, as well as all incident reports, in accordance with the Regulations. The environmental performance of all interest holders is assessed prior to issue of a petroleum title.</p>
Uncertainty in regulated activity	<ul style="list-style-type: none"> • Seismic program • Sand mining 	The EMP provides detail on the proposed seismic program. Sand mining is subject to a different regulatory regime, and is not a petroleum activity; hence is not appropriate to be included as an activity under the petroleum regulatory regime.

7. 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 detailed schedule for the regulated activity. As the schedule is likely to change, the NT EPA recommends the interest holder be required to submit an updated timetable for the regulated activity to DEPWS, on a quarterly basis.

Ongoing groundwater monitoring is not prescribed in the Code. Whilst the EMP commits to quarterly monitoring of groundwater after stimulation, the NT EPA recommends a Ministerial condition specifying the timing of groundwater monitoring and the form of the groundwater data, and should be inclusive of an interpretive report and the development of site-specific performance standards.

The EMP provides for *leak detection alarms to be responded to within 24 hours (subject to access)*. To provide certainty as to the interest holder's compliance in responding to leak detection alarms, the NT EPA recommends a Ministerial condition requiring the creation of records in instances where a site is inaccessible.

To clarify record creation and retention requirements, and provide certainty the interest holder, the NT EPA recommends a Ministerial condition requiring the creation and retention of records to demonstrate commitments made in relation to mitigation of an impact in an approved environment

management plan, whether in the risk assessment or elsewhere in the environment management plan, have been complied with.

It is noted the interest holder has included wording in some environmental performance standards which are contrary to the purpose of linking environmental performance standards to recordable incident reporting, such that recordable incident reports would not have to be made, contrary to the Regulations. It is recommended a condition be set to address this.

The interest holder has not yet received its Authority Certificate from the Aboriginal Areas Protection Authority for conduct of the activity on the affected land. It is noted an EMP is not able to be approved until the certificate has been obtained.

CONCLUSION

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

- 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 potential environmental impacts and environmental risks of the activity will be reduced to a level that is 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 Tamboran B2 Pty Ltd EMP be approved, the Minister considers approval conditions to achieve the following outcomes:

1. Certainty of the timing of the regulated activity through provision of an updated timetable prior to commencement, weekly activity reports during conduct of the regulated activity and quarterly timetable updates.
2. Certainty as to the extent and location of clearing through provisions of spatial data for areas cleared.
3. Certainty as to the interest holder's compliance with the approved EMP through submission of an annual performance report and a rehabilitation progress report to DEPWS to demonstrate the interest holder has met environmental outcomes and complied with the requirements set out in the Regulations, the Code, the Ministerial conditions and the EMP.
4. Certainty as to the timing of the submission of annual performance reports and rehabilitation progress reports.
5. Certainty as to the extent of greenhouse gas emissions through provision of an annual emissions report to DEPWS that summarises GHG emissions reported under the Australian Government's *National Greenhouse and Energy Reporting Act 2007* versus the predicted emissions in the EMP, with actual emissions to be verified by an independent auditor registered by the Clean Energy Regulator.
6. Certainty that the land is free from contamination and can meet rehabilitation requirements through recording of all spills in an internal register that includes location, source and volume of the spill and corrective actions.
7. Confirmation that GHG emissions are being offset through provision of a revised GGAP annually, to specify actual emissions (as measured and reported on in item 5 above), the quantum of Scope 1 and Scope 2 emissions to be offset in compliance with the offset commitments in the GGAP, and provision of annual demonstration of how those commitments have been met.
8. Confirmation that groundwater quality is not impacted through requiring groundwater quality monitoring to be conducted before, during and after hydraulic fracturing and submission of an interpretive report on groundwater quality based on groundwater analytes specified in the Code.

9. Confirmation that petroleum well integrity is maintained through a requirement that groundwater level/pressure monitoring at impact monitoring bores is conducted before during and after hydraulic fracturing.
10. Confirmation of the potential impact to downstream environments remains low through a requirement to undertake a flowback fluid risk assessment and reporting to consider the impacts and risks to fauna and potential for soil and water contamination from a loss of containment.
11. Clarification of the applicability of seismic charges for data acquisition in the Beetaloo, and its environmental benefit through the provision of the results of the seismic charges trial (data quality, environmental impact (including tree health and surface disturbance from the release of the charge), rate and location of misfire).
12. Confirmation that stakeholders are aware the low risk of undetonated charges remaining at depth.
13. Certainty as to the interest holder's compliance with commitments made in relation to mitigation of an impact by requiring the interest holder create and retain records to demonstrate commitments made in relation to mitigation of an impact in an approved environment management plan, whether in the risk assessment or elsewhere in the environment management plan, have been complied with.
14. Certainty as to the interest holder's compliance in responding to leak detection alarms, through the creation of records in instances where a site is inaccessible.
15. Confirmation as to the interest holders obligations of incident reporting requirements.
16. Confirmation of the potential impact to the receiving environment remains low through the requirement to undertake an assessment of the spill register to determine if testing of stormwater accumulated in well site sediment basins could result in release of contaminated water.
17. Certainty that the risk of an undetected spill is reduced to a level which is ALARP and acceptable through the requirement to install a pressure monitoring system on the gathering lines, in addition to the mass balance assessment of pumped volumes.



PAUL VOGEL AM
CHAIRMAN

NORTHERN TERRITORY ENVIRONMENT PROTECTION AUTHORITY

10 MAY 2024