

Onshore Petroleum Activity – NT EPA Advice

ORIGIN ENERGY B2 PTY LTD (ORI9-2) – ENVIRONMENT MANAGEMENT PLAN (EMP) FOR KALALA S-1, 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	Kalala S-1 Environment Management Plan EP98 - Beetaloo Sub-Basin, NT
EMP document reference	ORI9-2
Regulated activity	<p>The EMP proposes ongoing exploration and appraisal activities for Kalala S site, which includes maintenance of the site and the Kalala S-1 well. The Kalala S site is located approximately 17 km ESE of Daly Waters in EP98 in the Beetaloo Sub-basin.</p> <p>The regulated activity is as follows:</p> <ul style="list-style-type: none"> • civil maintenance of Kalala S site including erosion and sediment controls (ESC) on the access tracks, lease pad and camp pad

Subject	Description
	<ul style="list-style-type: none"> • operation of a temporary camp, offices and equipment storage areas • construction of up to four groundwater monitoring/extraction bores to facilitate future exploration activities • maintenance and monitoring of infrastructure on the Kalala S site, including well interventions, work overs, completion and general well maintenance and diagnostic activities • routine reservoir testing and data acquisition using reservoir evaluation tools (and other methods) • suspension and/or abandonment of the Kalala S-1 well • rehabilitation of the site upon completion of exploration activities <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>Progressive site decommissioning and rehabilitation will commence on or before Quarter 3 2026. A rehabilitation plan is included as Appendix C of the EMP.</p>
Public consultation	Public consultation on the EMP was not required under regulation 8A(1)(b); as the EMP does not propose hydrocarbon drilling or hydraulic fracturing.

Origin conducted an exploration drilling program in 2015 and 2016 on EP98 and EP117. ¹ Three vertical wells (Kalala S-1, Amungee NW-1 and Beetaloo W-1) and one horizontal well (Amungee NW-1H) were drilled. The Kalala S-1 exploration well was spudded on the 14 July 2015 and reached a total depth of 2,619 m below ground level (mbgl) on 2 September 2015. The well was suspended on 2 September 2016 and the site was demobilised.

The exploration activities covered in the EMP include: site access and civil maintenance; exploration well monitoring and maintenance; exploration well data collection; installation of groundwater monitoring bores; camp operations; well suspension and decommissioning; and site rehabilitation. A further breakdown of these activities is listed in Table 7 of the EMP.

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 involves maintenance and monitoring of the existing EP98 Kalala S well site during 2022-2026. The program includes civil maintenance, construction of groundwater monitoring bores and rehabilitation. No drilling of hydrocarbon wells, clearing or hydraulic fracturing activities are proposed in the EMP. On completion of the well maintenance activities, the well will either be suspended for future re-entry or decommissioned with permanent cement plugs and rehabilitated in accordance with the Well Operations Management Plan (WOMP) and requirements outlined in the Code of Practice: Onshore Petroleum Activities in the Northern Territory (the Code).

The total footprint for the regulated activity is 4.65 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 3 2026. A rehabilitation plan has been developed for the activity, to return the disturbed land to an environment similar to the pre-

¹ https://depws.nt.gov.au/_data/assets/pdf_file/0010/258607/Origin-2015-Environmental-Plan-SummaryBeetaloo-Sub-Basin.PDF

disturbance conditions. Table 1 provides an overview of the key components of the regulated activity. The schedule of activities proposed in the EMP is listed in Appendix 1.

Table 1: Key components of the proposed Origin Kalala S program

COMPONENT	REGULATED ACTIVITY
Wells (#)	1 (pre-existing) Kalala S-1
Groundwater extraction licence	GRF 10285
Total area of exploration lease (EP98)	10,257 km ²
Number of lease pads	1 (pre-existing) Kalala S
Number of groundwater monitoring bores	1 pre-existing (RN 039895) 3 impact and 3 control (proposed)
Number of gravel pits	Nil
Number of creek crossings	Nil
Timing of works	Q1 2022 with ongoing maintenance, rehabilitation and monitoring until Q3 2026
Camp capacity and workforce	~20 persons during operations. Existing camp pad to be utilized where required
Peak traffic movements (per day)	<10 vehicles per day peak during mobilisation and demobilisation. Likely to be restricted to several days over a 1-2 week period per year
Estimated total groundwater usage (ML)	< 0.5/year
Estimated potable water usage (kL) per day	5
Diesel (kL)	20
Greenhouse gas emissions (tCO ₂ -e)	~46
Rehabilitation (ha)	4.65

A rehabilitation plan (Appendix C) has been developed for the activity, to minimise the risk of site erosion and return the disturbed land to the original conditions, in accordance with clause A.3.5 of the Code. Progressive rehabilitation of the drill lease pad, camp area, access track and associated infrastructure will be implemented within 12 months of the completion of petroleum activities. The timing of completion will be dependent upon:

- If there is no requirement to keep the Kalala S-1 well to support future exploration and appraisal activities, the well will be decommissioned. As part of this, cement plugs will be installed as permanent barriers to flow prior to cutting off the wellhead. The cement plugs will be set and tested prior to decommissioning as per Origin Standards and Section B.4.15.2 of the Code. All surface infrastructure and waste will be removed from site and disposed of in accordance with the Regulations and specifically the *Waste Management and Pollution Control Act 1999* (WMPC Act).
- If the well is suspended, barriers will be installed as per B.14.5 of the Code, with cemented well casing and a wellhead being the minimum requirement. Well pressure will be routinely monitored as per Origin's Well Integrity Management Plan (WIMP) to confirm well integrity is intact. The Kalala S site will undergo civil maintenance in accordance with the principles outlined in the NT Land Clearing Guidelines (2019). Well decommissioning is scheduled for Q3 2026.

The EMP identifies wastewater as water generated from dust suppression and camp activities. Flowback or drilling wastewater will not be generated from the proposed activities in the EMP. Minor volumes (~ 0.1 ML) of ancillary wastewater generated through well intervention activities (such as

completion fluids used for well control/ maintenance) will be managed in accordance with the Code and WMPC Act. The interest holder proposes several management strategies for incidental wastewater management, which include:

- storing wastewater in enclosed tanks on the well pad with secondary containment
- daily monitoring of water level during operations
- weekly tank inspections
- transporting wastewater to an existing wastewater storage area within the Beetaloo Basin for evaporation/treatment or to a licensed offsite wastewater disposal facility.

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. No restricted works areas (RWA) have been identified in the vicinity of the Kalala S-1 site.
- all staff to be inducted covering cultural heritage
- implementation of an “unexpected finds” procedure.

The interest holder has identified the impacts and risks associated with the regulated activity (47 in total). Mitigations outlined in the risk register (Appendix F) 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 EMP.

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

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

The 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 regulated activity have been assessed. All of the 47 identified risks 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 and 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.

Measures for managing risks during wet season operations include:

- all chemical storage areas will be bunded, with covers used (where safe and appropriate) to prevent rain ingress and bund overflows
- no wastewater (from drilling or flowback) will be generated from the activity or stored on site
- daily inspections (either physical or via cameras) will be completed on chemical storage
- personnel will be located within the basin regionally (at Daly Waters or an operating site within the Basin) at other times
- helicopters will be used to transport people and supplies into and out of the site when access is restricted
- transportation of wastewater or chemicals is not anticipated during the wet season. If transport is to be undertaken during the wet season, a task specific risk assessment will be completed prior to the transport (ensuring that site conditions are constantly updated) to demonstrate 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 outcomes are met.

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

The EMP proposes that maintenance and monitoring activities, including progressive rehabilitation are planned to commence during 2022 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 will be implemented if activities continue into the wet season (October to April inclusive).

A certified Erosion and Sediment Control Plan (ESCP) (Appendix D) contains design and management controls to mitigate potential erosion under sheet flow conditions. The layout for the Kalala S pad and access tracks is 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 well site. The peak traffic volume from the activity on the Carpentaria Highway is estimated at < 10 vehicles per day during mobilisation and demobilisation, 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 bunded areas at the accommodation camp and on the Kalala S-1 pad. The mitigation controls described in the EMP include: secondary containment for all chemical storage and handling areas; double walled containment of hydrocarbons; and spill prevention and response procedures for hazardous spill prevention, monitoring, assessment, response and clean-up.

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 46 tonnes of carbon dioxide equivalent (tCO₂-e), generated, comprising approximately 43 tCO₂-e from diesel combustion from transportation activities and 3 tCO₂-e from diesel combustions from well maintenance. This represents less than 0.001% of the 2019 NT estimated GHG emissions (20.6 million tCO₂-e)² and 0.008% of Australia's total emission (assuming emission intensities are the same). The EMP also refers to the cumulative GHG emissions from the regulated activity and the interest holder's previously approved regulated activities since the commencement of activities in 2019. The total emissions for Origin's current approved, remaining and proposed activities are anticipated to be between 45,297 and 177,780 tCO₂-e, peaking in 2023.

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 with a maximum water entitlement of 175 ML/year from the Gum Ridge Formation. The interest holder proposes to extract water from the onsite bore RN039895. All groundwater take will be metered with continuous flow meters. The interest holder estimates that approximately 0.5 ML of water will be extracted from the Gum Ridge Formation per year to support the maintenance and monitoring program.

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).

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.

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 (s23 *Environment Protection Act 2019*)

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

² Source: DISER 2020. *State Greenhouse Gas Inventory*. <https://ageis.climatechange.gov.au/SGGI.aspx>.

- a land condition assessment in August 2014 that reviewed the physical, natural and cultural heritage environment of the existing Kalala S site
- a baseline weed survey of the Kalala S site in 2018 and follow-up surveys every six months thereafter
- an archaeological assessment in August 2014 of sites within EP 98, including Kalala S.

The Kalala site is located within *Corymbia* dominated woodland with a diverse understorey and dense grass cover. This vegetation type is widespread in the tropical savannas of the Northern Territory and not subject to extensive clearing. There are no threatened vegetation communities listed or likely to occur within or in proximity to the Kalala S site. The closest areas of conservation significance to the site are:

- the Bullwaddy Conservation Reserve, located ~70 km south-east from the proposed activity area
- the EPBC Listed Lake Woods, located ~150 km south-west from the proposed activity area and is listed on the National Directory of Important Wetlands.

The EMP identifies 12 fauna species listed as threatened under the Australian Government *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) and/or the NT *Territory Parks and Wildlife Conservation Act 1976* (TPWC Act). No core habitat for these species was identified at the S site (lease pad, camp pad and access tracks). An assessment of the likelihood of occurrence indicates five listed threatened species that may possibly occur in the wider landscape 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. Plains Death Adder (*Acanthopsis hawkei*) (Vulnerable EPBC Act, Vulnerable TPWC Act).
5. Yellow-spotted Monitor (*Varanus panoptes*) (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 noise, vehicle strike, dust, erosion and spills to be as low as reasonably practicable.

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, 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 (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 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 and acceptable (regulation 9(1)(c))

The interest holder has included measures in the EMP 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:

- soil erosion and compaction from cleared areas (access tracks, lease pads, gravel pits and camp pads) impacting sensitive receptors and leading to loss of long-term soil productivity and viability
- introduction and spread of weeds
- accidental ignition of fire from exploration activities (site preparation, slashing and general access) and site activities (site preparation, slashing and grinding)

The EMP also considers cumulative impacts to groundwater quality, flora and fauna, greenhouse gases, surface water quality, 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 47 environmental risks identified by the interest holder, all are considered 'low' risk, and therefore are ALARP.

Key risk mitigations include:

1. *Soil erosion and compaction from cleared areas, impacting sensitive receptors and leading to loss of long-term soil productivity and viability:* No land clearing is proposed, and the existing site has an established erosion and sediment control plan in place; the existing features at the site will be maintained, with erosion and sediment controls kept in working order; pre- and post-wet season sediment control inspections will be conducted; and maintenance will be performed on areas where erosion is occurring or where sediment controls are ineffective.
2. *Introduction and spread of weeds:* All equipment and vehicles to be washed-down and have a Biosecurity Declaration Certificate prior to access to site; activity will be restricted to the lease pad and camp pad; areas of proposed exploration have been surveyed and are deemed to have low weed abundance; the interest holder has committed to six monthly monitoring around infrastructure to detect the spread/ introduction of weed species; and weed infestations will be treated in accordance with the Weed Management Plan where they associated with the activities of the interest holder.
3. *Accidental ignition of fire from exploration activities and site activities:* No major civil works or flaring are proposed in the EMP; a bushfire management plan will be implemented to prevent and respond to bushfires including establishment of communication and fire response protocols with pastoralists; bushfire awareness will be included in site inductions; firefighting equipment will be available to deal with fires; fire breaks have been constructed around the exploration lease and camp pads; daily monitoring of bushfires will be conducted in the region during periods of high fire danger; and fire hazard reduction strategies (such as back burning) to be implemented to reduce the risk of fire ignition/ impact as required.

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 14 and Figure 8), outlining the sequencing of works.

CONCLUSION

The NT EPA considers that, subject to the Minister applying 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 Beetaloo Sub-basin Kalala S EP98 be approved, the Minister considers an approval condition to achieve the following outcome: Submission of an annual performance report to DEPWS each year for the term of the EMP 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.



PAUL VOGEL AM

CHAIRPERSON

NORTHERN TERRITORY ENVIRONMENT PROTECTION AUTHORITY

3 FEBRUARY 2022