From: Central Australian Frack Free Alliance <frackfreecoordinator@gmail.com>
Sent: Thursday, 9 June 2022 5:21 PM
To: SweetpeaPetroleum DEPWS
Subject: central australian frack free alliance submission

Dear Hon Minister Lawler and staff at the department of Environment and Water Security,
We are writing to express our concerns SWP3-1: Well Drilling, Hydraulic Fracture Stimulation and Well Testing NT Exploration Permit (EP) 136 Beetaloo Sub-basin NT Environment Management Plan

We wrote a submission to the previous iteration of this EMP, which was withdrawn. Our concerns still stand, so please see our previous submission to understand our perspective. Additionally we note that the current version of the EMP has an even higher number of projected GHG emissions, which puts it above the large Emitters annual threshold and means Sweetpea should be required to submit a GHG Abatement Plan under the Large Emitters Policy. There is no sign of this in the EMP?

Kind regards, Hannah

On behalf of,
Central Australian Frack Free Alliance

Mob: 0431009912

Email: frackfreecoordinator@gmail.com

I acknowledge the Arrernte people whose country I work on, and pay respects to elders, past present and emerging.

Dear Hon Minister Lawler and staff at the department of Environment and Water Security,

We are writing to express our concerns SWP3-1: Well Drilling, Hydraulic Fracture Stimulation and Well Testing NT Exploration Permit (EP) 136 Beetaloo Sub-basin NT Environment Management Plan

About Us:

We are CAFFA (Central Australian Frack Free Alliance), a grassroots community group with the goal to protect our water, health, community and country by opposing unconventional gas extraction in the NT. We have 127 registered members and 2.8 thousand facebook followers.

Over the last seven years our commitment has been to raise awareness and inform the wider community about the risks posed by the damaging and poorly regulated oil and gas industry. CAFFA is a group of community members who have serious concerns over the impacts of developing an unconventional shale gas industry in the Northern Territory. See our key concerns with this EMP below. Please note that there is some repetition between this and the other EMP submissions that are open now. Many of our concerns are the same for all drilling and fracking work in the Beetaloo/Macarthur Basin, and we are a volunteer organisation with limited capacity to respond to 3 EMPs at once.

The cumulative greenhouse gas emissions associated with the fracking industry are not in line with NT gov climate commitments and are increasingly dangerous

We are currently seeing sweetpea put this EMP in at that same time as 2 large submissions by Origin Energy and Imperial Oil and Gas. Origin estimates that its fracking plans will emit 146,518 to 273,030 tonnes of greenhouse gases into the atmosphere. This equates to 1.3% of the Territory's entire greenhouse gas emissions for 2019 - just for one company's early exploration fracking plans alone! Analysis completed for the Federal Government last year found that if they're allowed to go ahead with their plans, gas companies could be drilling and fracking 20-40 new wells annually in the next few years, and 200-300 if the industry heads into full-scale production. That would mean 1-2 million tonnes of greenhouse gases in the next few years, and 10-15 million tonnes every year for a full-scale fracking industry. Every exploration well drilled by Sweetpea or others is a step towards commercial gas production - including the exploration fracking proposed in this EMP - is a step towards climate catastrophe. The NT doesn't yet have a greenhouse gas policy relating to fracking, so there are no obligation for Sweetpea to reduce or offset the carbon emissions from its fracking plans. This situation poses an unacceptable risk to the global climate, and approving the EMP would significantly undermine the Territory's target of net zero emissions by 2050.

NT water regulations inadequate to manage the risks of the proposed drilling program

Every fracking project carries the risk of chemical spills during the transport and processing of toxic fracking fluid, from the wastewater storage tanks that are left open and risk overflow during heavy rainfall in the wet season, and during the high pressure pumping of fracking fluid into rock formations targeted for gas extraction. These toxic chemicals are poisonous to people and ecosystems, and can persist in the environment for many decades.

Aquifers in the areas sweetpea wants to frack feed into underground water resources relied upon by communities and fragile ecosystems, including the beloved and ecologically significant Lake Woods conservation area. Chemicals like the biocides used in frack wells are toxic even in minuscule concentrations, and contamination from fracking could irreparably damage these water resources and endanger the communities, businesses and wildlife that rely on them.

Fracking also uses and contaminates huge volumes of water, which is then too toxic to be properly recycled and reused, or fed back into aquifers. There is no Water Allocation Plan (WAP) in place for the Beetaloo region, meaning that there is no way of knowing whether the NT Government can safely and sustainably allocate Sweetpea and other fracking companies the enormous amounts of water they require without impact on other water users.

Currently, water in the Beetaloo exists in a regulatory void. The NT community has been calling for a *Safe Water Drinking Act* to protect its water sources and make sure there are appropriate liability pathways in place for water contamination. Given the real risks posed to drinking water sources by fracking, Sweetpea can't be allowed to frack the Beetaloo until communities can be assured that their water is properly safeguarded.

Pepper Inquiry recommendation implementation horrendously slow, SREBA incomplete and insufficient by design

The Pepper Inquiry into Fracking in the NT found that the danger fracking poses to water resources, community health and the environment could *only* be reduced to an acceptable level if *all* of its recommendations were fully implemented. Recent analysis[1] of the progress of pepper inquiry recommendation implementation shows that after 4 years, only 27% of the recommendations have been fully implemented so far, despite the government's continued promise that all recommendations must be fully implemented before production, something htat the government is saying may start as soon as next year.

These recommendations included a comprehensive baseline study into environmental and social values in the Beetaloo, the SREBA. The SREBA, along with most of the other Pepper Inquiry recommendations, has not been completed. In fact, the NT Government recently halted its support for crucial research into underground organisms ('stygofauna'), after scientists realised that the presence of these stygofauna across large distances probably means that aquifers in the Beetaloo are connected to waterways relied upon by communities outside the

[1] https://www.lockthegate.org.au/only_a_quarter_of_nt_fracking_recommendations_implemented_in_full_nearly_four_years_since_inquiry

Basin - and would therefore be at risk of contamination from fracking's dangerous chemicals. Without the baseline understanding of how essential water resources are connected and could be impacted by fracking, it is impossible for Sweetpea to declare it is able to manage and prevent harm to the regions water from the proposed activities.

Sincerely, Central Australian Frack Free Alliance

[redacted]

From: Nicholas Taylor <ntaylor@emanatelegal.com.au>
Sent: Monday, 20 June 2022 5:25 PM
To: SweetpeaPetroleum DEPWS
Cc: Barry Taylor; Genie Hearn
Subject: [200134] Yarabala Pty Ltd : Sweetpea Petroleum Pty Ltd
Attachments: J0123 Sweetpea Petroleum Environmental Management Plan Review_20062022.pdf

Attention: Department of Environment Parks and Water Security

Yarabala Pty Ltd (ACN 001 832 944) as Trustee of the John Beetaloo Trust and BB Barkly Pty Limited (ACN 622 678 013) as trustee of the BB Barkly Unit Trust (Beetaloo)
Sweetpea Petroleum Pty Ltd ABN 42 074 750 879(Sweetpea)

We refer to Well Drilling, Hydraulic Fracture Stimulation and Well Testing Environment Management Plan EP136 - Beetaloo Sub-basin, NT dated 5 May 2022 (**Drilling and Fracking EMP**) (copy attached).

Land

Beetaloo Station, more properly described as Perpetual Pastoral Lease (PPL) 0159; NT Portion 702.

Mungabroom Station, more properly described as Perpetual Pastoral Lease (PPL) 01018; NT Portion 308.

(collectively the **Land**)

Retainer

Emanate Legal is retained to act on behalf of Beetaloo with regard to all dealings in this matter.

Future Communications

Beetaloo gives notice to Department of Environment Parks and Water Security of Emanate Legal's retainer.

Would you please ensure that any and all correspondence and/ or documentation in this matter are directed to Emanate – and not direct to Beetaloo.

Emanate will liaise with Beetaloo to obtain instructions and revert to Department of Environment Parks and Water Security.

Drilling, Hydraulic Fracture Stimulation and Well Testing Environment Management Plan EP136 - Beetaloo Sub-basin, NT dated 5 May 2022 (Drilling and Fracking EMP)

Sweetpea have filed an application for approval of Drilling, Hydraulic Fracture Stimulation and Well Testing Environment Management Plan EP136 - Beetaloo Sub-basin, NT dated 5 May 2022, for which public consultation closes 20 June 2022, wherein it has detailed the '*Regulated Activity*' (RA) it intends to undertake.

Would you please find attached a copy of Beetaloo's Submissions: Review of Impacts of the Regulated Activities - Sweetpea Petroleum Environmental Management Plan – Well Drilling, Hydraulic Fracture Stimulation and Well Testing.

Future Action

Should you wish to discuss the foregoing please do not hesitate to contact Barry Taylor or Nicholas Taylor.

Kind Regards,

Nicholas Taylor
D: +61 7 4727 0110
M: +61 438 725 047
W: emanatelegal.com.au

Offices: Brisbane | Townsville | Roma

Review of Impacts of the Regulated Activities - Sweetpea Petroleum Environmental Management Plan – Well Drilling, Hydraulic Fracture Stimulation and Well Testing

Beetaloo Station, Perpetual Pastoral Lease (PPL) 0159; NT Portion 702.

Mungabroom Station, Perpetual Pastoral Lease (PPL) 01018; NT Portion 308

BASE/

Client	C/O Emanate Legal Pty Ltd
Reference	J0123

Document Control

Title	Sweetpea Petroleum Environmental Management Plan Review
Address	Beetaloo Station and Mungrabroom Station
Job Number	**J0123**
Client	C/O Emanate Legal Pty Ltd

1.0 Introduction

1. Base Consulting Group was retained by Emanate Legal to provide advice regarding the information outlined within the Petroleum Exploration Program Well Drilling, Hydraulic Fracture Stimulation and Well Testing Environment Management Plan (EMP) (SWP4-1– 5 May 2022) prepared by Sweetpea Petroleum Pty Ltd for the proposed Regulated Activities on the property described as: Tanumbirini Station, more properly described as Perpetual Pastoral Lease (PPL) 1060; NT POR 701

2. The proposed EMP identifies the following Regulated Activities:

    A. Ongoing use, maintenance, and wet weather upgrade (where required) of access tracks.
    B. The ongoing operation of accommodation camp services to support the exploration operations – it is proposed to use a single camp location at one of the two locations proposed under the Seismic EMP and the C&WB EMP; we seek approval to increase the size of the camps approved under those EMPs from 1.3 ha to 2.5 ha as per Table 1.
    C. Continued access to the approved gravel pits for resource extraction.
    D. Exploration activities at up to seven well pads, including but not limited to the following:
        i. Exploration well drilling and completions - vertically to a depth no greater than 4,000 metres.
        ii. Hydraulic fracture stimulation (horizontal wells and associated vertical wells), including water storage.
        iii. Production testing and follow up testing, monitoring and work-over activities and management of wastewater.
        iv. The use of the installed water bores for monitoring and extraction of water (maximum annual extraction of 299 ML/yr) for exploration activities, in accordance with approved water extraction licence GRF10346 under the NT Water Act 1992.
        v. Routine and ongoing maintenance of any infrastructure and or services.
        vi. All activities associated with the plugging, abandonment, decommissioning and / or remediation of wells after testing and monitoring has been completed.
    E. Any other minor works ancillary to the above-mentioned works.

3. The EMP Includes:

    A. Table 3 shows the location of the activities.

    B. Identifies in Section 1.5.2 that the regulated Well and associated exploration activities are entirely contained within Tanumbrini Station PPL in the Northern Section of EP136.

    C. Describes in Section 3.1 of the document that the exploration well drilling (Regulated Activity) includes vertically to a depth no greater than 4,000 m and with a target measured depth range of horizontal wells from 4,000 m to 7,000 m (this would include a lateral section of between approximately 1,000 m and 4,000 m).

4. The EMP is required to meet the requirements of Part 2 *Petroleum (Environment) Regulations 2016,* including:

    A. Stakeholder Engagement (Section 7.0)

    B. Approval Criteria (Section 9.0 and Schedule 1)

5. The EMP includes Figure 2 (Refer to Image 1 below) showing the location of Regulated Activities described within the EMP noting a 1km Bore Buffer that extends into Beetaloo Station.

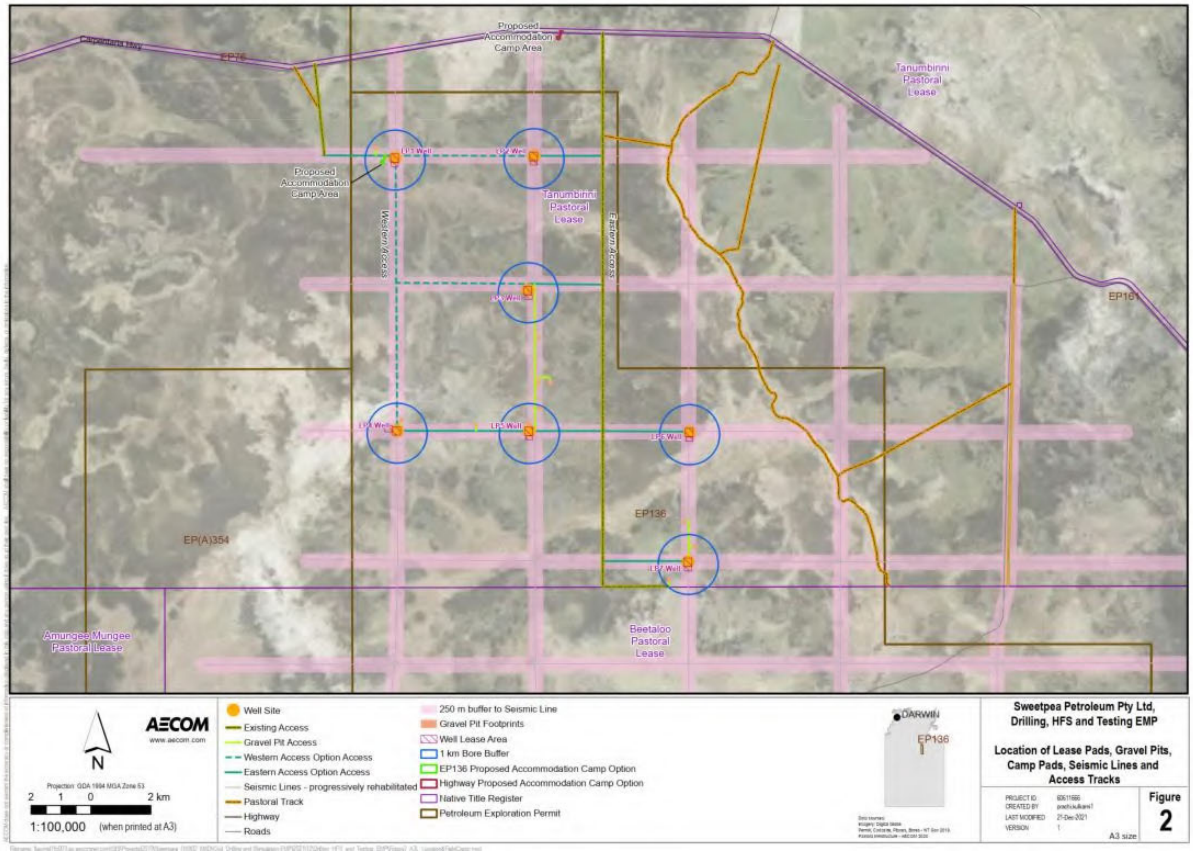


IMAGE 1 – Extract Figure 2 of EMP

6. A review of the EMP identifies inconsistencies with the description of the regulated activities including:

   A. Section 1.3 states that the Exploration well drilling and completions that drilling vertically will be to a depth no greater than 4,000 metres.

   B. Section 3.1 states that the Drilling and completions - vertically to a depth no greater than 4,000 m and with a target measured depth range of horizontal wells from 4,000 m to 7,000 m (this would include a lateral section of between approximately 1,000 m and 4,000 m).

   C. Section 3.5 states that the Exploration well drilling and completions of a vertical pilot well will be drilled at each exploration lease, to approximately 2,500 - 3,500 m with a fit-for-purpose drilling rig (Refer to Image 2 - Extract of EMP Figure 12). A horizontal sidetrack with a 1,000 - 3,000 m lateral length will then be drilled from the pilot well, into the selected target (Refer to Image 2 - Extract of EMP Figure 12).

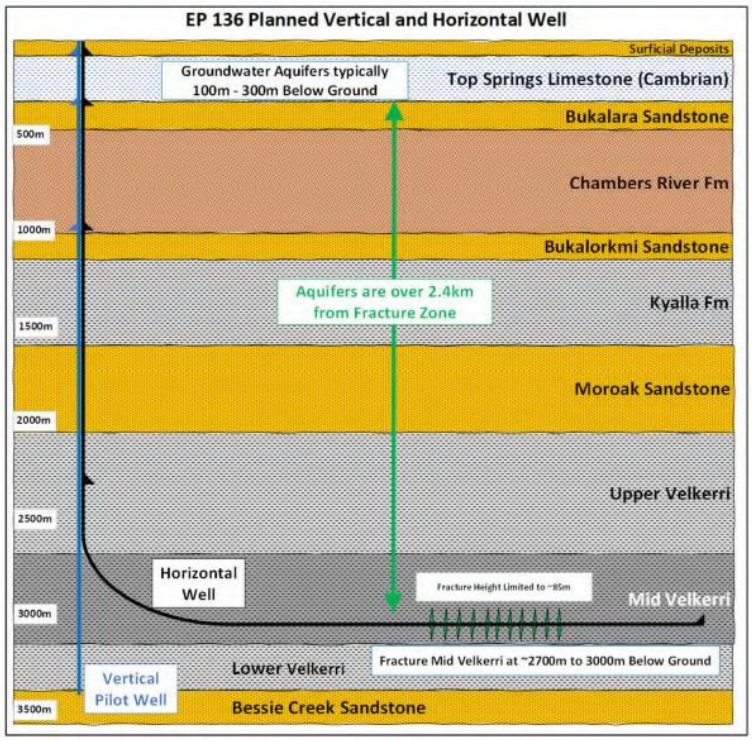


Figure 12 Example schematic of a vertical and horizontal well profile

IMAGE 2 – Extract of Figure 12 of EMP.

7. Appendix A and Image 3 (below) shows the nominated exploration wells and associated 4,000m lateral drill extent in relation to EP136, Tanumbrini Station and Beetaloo Station. The works extend beyond EP136 and extend into Beetaloo Station.

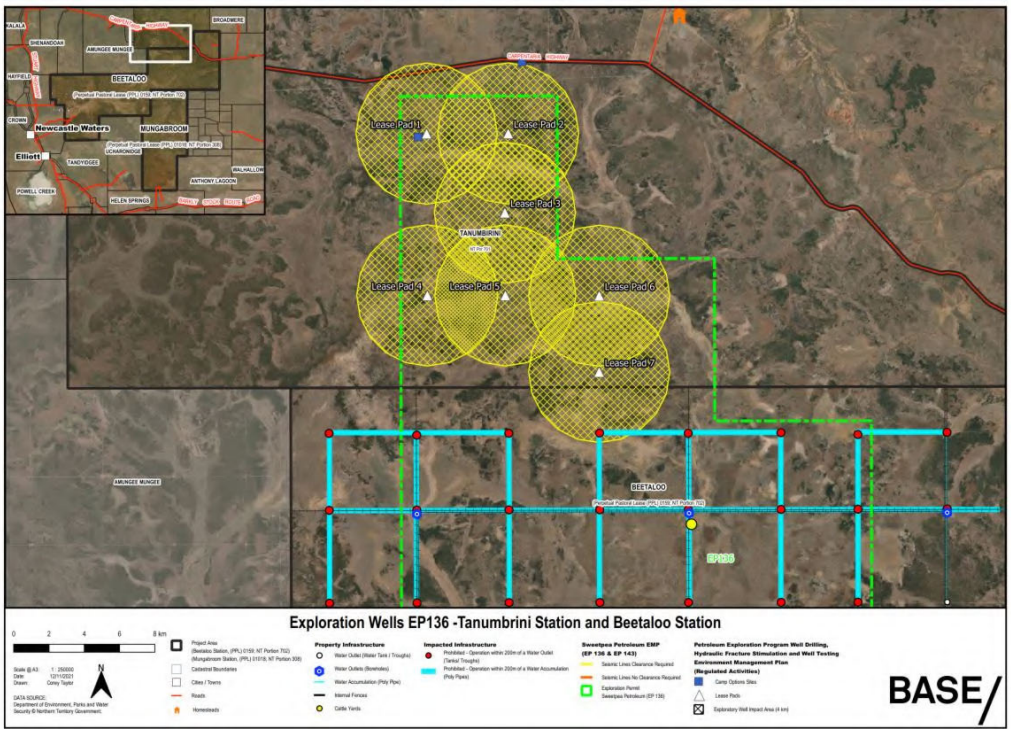


IMAGE 3 – Lateral Disturbance Footprint of Seismic Activities

8. As shown in Image 3 and Appendix B, The EMP includes Regulated Activities that extend beyond EP136. No Authority exists that would allow Sweetpea to undertake Regulated Activities outside of EP136. To that end, the EMP must not grant rights for Sweetpea to undertake Regulated Activities beyond the exploration permit area.

9. The EMP includes Regulated Activities that extend into Beetaloo Station, yet Section 1.5.2 of the EMP indicates only Tanumbrini Station is impacted.

10. Figure 21 of the EMP (Refer to Image 4 – Extract of Figure 21) shows the location of Regulated Bores on Tanumbirini Noting Bore RN031245 is within 1km of the impact zone of Well Pads 3 & 5. As per Section 111 of the *Petroleum Act 1984* construction of a Well pad is prohibited on land that is within 1km of a designated bore.

Stakeholder Engagement

11. As per section 5.2.1, "EP136 covers both Beetaloo and Tanumbirini stations, the regulated petroleum exploration activities under this EMP are proposed to be undertaken on Tanumbirini PPL only". As mentioned, the proposed EMP includes Regulated Activities that extend into Beetaloo Station.

12. No stakeholder engagement was undertaken with Beetaloo Station regarding the impacts of the proposed activities as detailed within the EMP. No consideration has been given to the horizontal drilling, it is unclear where the horizontal bore will go. I.e. North, South, East or West. A map must depict where this 4km of the horizontal bore will travel. The location must be depicted on a map, and the impact of the drilling and fracking be assessed along its length.

Assessment of Environmental Impacts

13. The Environment is defined as per Section 6 of the Environment Protection Act, 2019. The definition of environment is as follows:

14. Environment means all aspects of the surroundings of humans, including physical, biological, economic, cultural and social aspects.

15. The EMP does not provide a complete assessment of the environment. Section 4.3 of the EMP provides a broad assessment of the Social and Economic Environment only and does not consider the use of the impacted lands and the associated economic aspects.

16. Appendix A summarises the property infrastructure on Beetaloo Station, including fencing, water bores, Polypipe, water tanks, and troughs that contribute to the economic and social environment. The EMP does not include any assessment of the impact on the pastoral activities occurring on Tanumbrini Station and Beetaloo Station. No maps or plans exist within the EMP describing these aspects of the Environment.

17. The assessment of Natural Environment Section 4.2 of the EMP is not based on any on-ground site-specific assessment at the location of the proposed Regulated Activities. The assessment relies on aerial imagery only.

Cumulative Effects

18. The EMP does not undertake an assessment of the cumulative effects of identified impacts when considered with each other and in conjunction with any other activities or events that occurred in or near the permit areas for the regulated activity as required by Schedule 1 of the Petroleum (Environment) Regulations 2016.

19. Specifically, the EMP does not consider other Regulated Activities impacting Tanumbrini Station and Beetaloo Station proposed by Sweetpea or other resource companies. The consideration of the range and timing of impacts is critical and should not be considered in a piecemeal nature.

Aboriginal Areas Protection Authority (AAPA) Authority certificate

20. Aboriginal Areas Protection Authority (AAPA) Authority certificate 2020/072 does not allow for the extraction of water for drilling or fracking purposes. The conditions of the AAPA certificate 2020/072 do not expressly provide for the taking of water for the drilling and fracking of wells. Unlike other express provisions in this Certificate relating to the taking of water for the camp from existing bores, there is no express provision in the AAPA certificate allowing for the extraction of water for drilling and fracking. As such, the approval criteria requiring a consistent AAPA certificate are not met.

2.0 Conclusion

21. The review of the proposed Well Drilling, Hydraulic Fracture Stimulation and Well Testing Environmental Management Plan does not meet the requirement of the Petroleum (Environment) Regulation 2016. Specifically:

    A. Stakeholder Engagement has not been undertaken in accordance with Section 7 of the regulation.

    B. The EMP shows Regulated Activities occurring outside the Exploration Permit Area; therefore, rights cannot be granted to these works.

    C. The EMP does not consider the environment as defined, which includes all aspects of the surroundings of humans, including physical, biological, economic, cultural and social aspects.

    D. The EMP ignores the economic and social aspects of the environment particularly as they relate to existing cattle businesses operating on impacted properties.

    E. No site-specific assessment has occurred to understand the environment at each Regulated Activity location. It would be expected that a detailed site assessment, including but not limited to flora, fauna, waterways, property infrastructure, water accumulation etc would be provided so as to describe environmental values and features and adequately consider impacts.

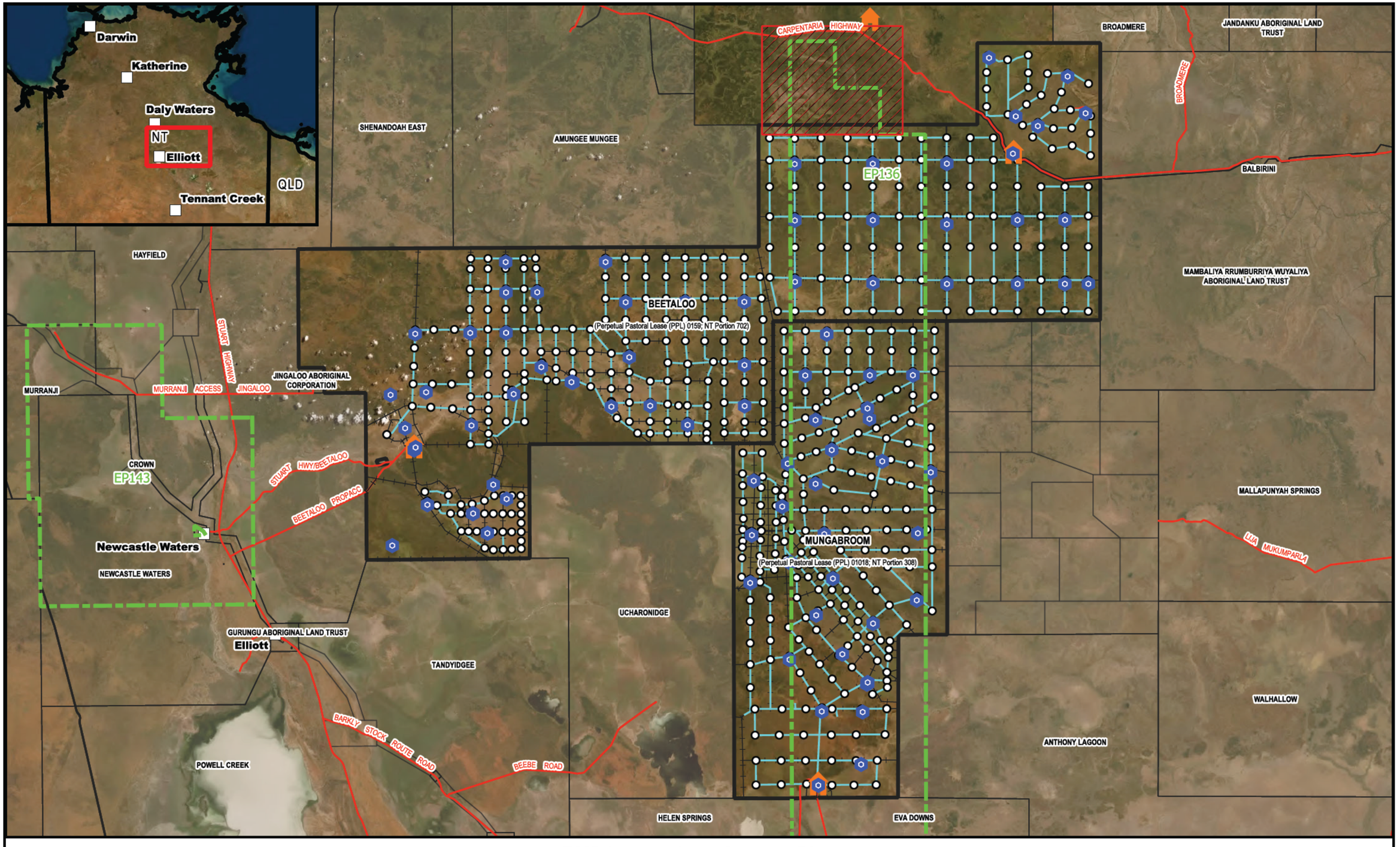
    F. The EMP does not consider the cumulative impact of regulated activities proposed by Sweetpea and other Exploration Companies over Beetaloo Station and Tanumbirini. Given the previous Seismic EMP granted, obvious questions should be raised about other Regulated Activities intended over Beetaloo Station.

    G. The entire risk assessment process should be reviewed in further detail and questioned. This review should include consideration from an expert hydrogeologist.

    H. The following should be considered and addressed as per the Hydrogeologist Expert advice set out in Appendix B.

        - Provide an explanation of “fresh” water and “major” fault.
        - Advise the criteria for designating an exploration or appraisal well as successful.
        - Advise the longer-term full-scale exploitation of the gas field should this programme be successful, number and siting of wells, the footprint of subsurface horizontal wells.
        - Proximity and cumulative impact with other similar projects in the Beetaloo Basin.
        - Include short term and long term climate risks in the EMP firstly under current conditions and also long term based on full-scale operation and accumulative gas emissions from the whole Basin.
        - Commit to the construction of Intervention and Compliance wells at each of the seven sites into the Bakalara Sandstone.
        - Commit with other operators in the Beetaloo Basin to funding additional study of the groundwater regime in the Basin
        - Fault Maps – the need to present in order to understand any risks and complete a proper risk assessment.
        - Provide commitment to checking well integrity and IMBs/CMBs after completion and then during operation of the future wellfield.
        - Explain more clearly what actions are proposed should complex faulting and potential seismic activity be identified during fracking.
        - Confirm that a qualified hydrogeologist was involved in the risk assessment.

Appendix A Exploration Wells EP136 - Tanumbrini Station and Beetaloo Station



EMP Impact Area Context Plan

0 5 10 15 20 km

Scale @ A3: 1 : 725000
Date: 12/11/2021
Drawn: Corey Taylor

N

DATA SOURCE:
Department of Environment, Parks and Water Security © Northern Territory Government

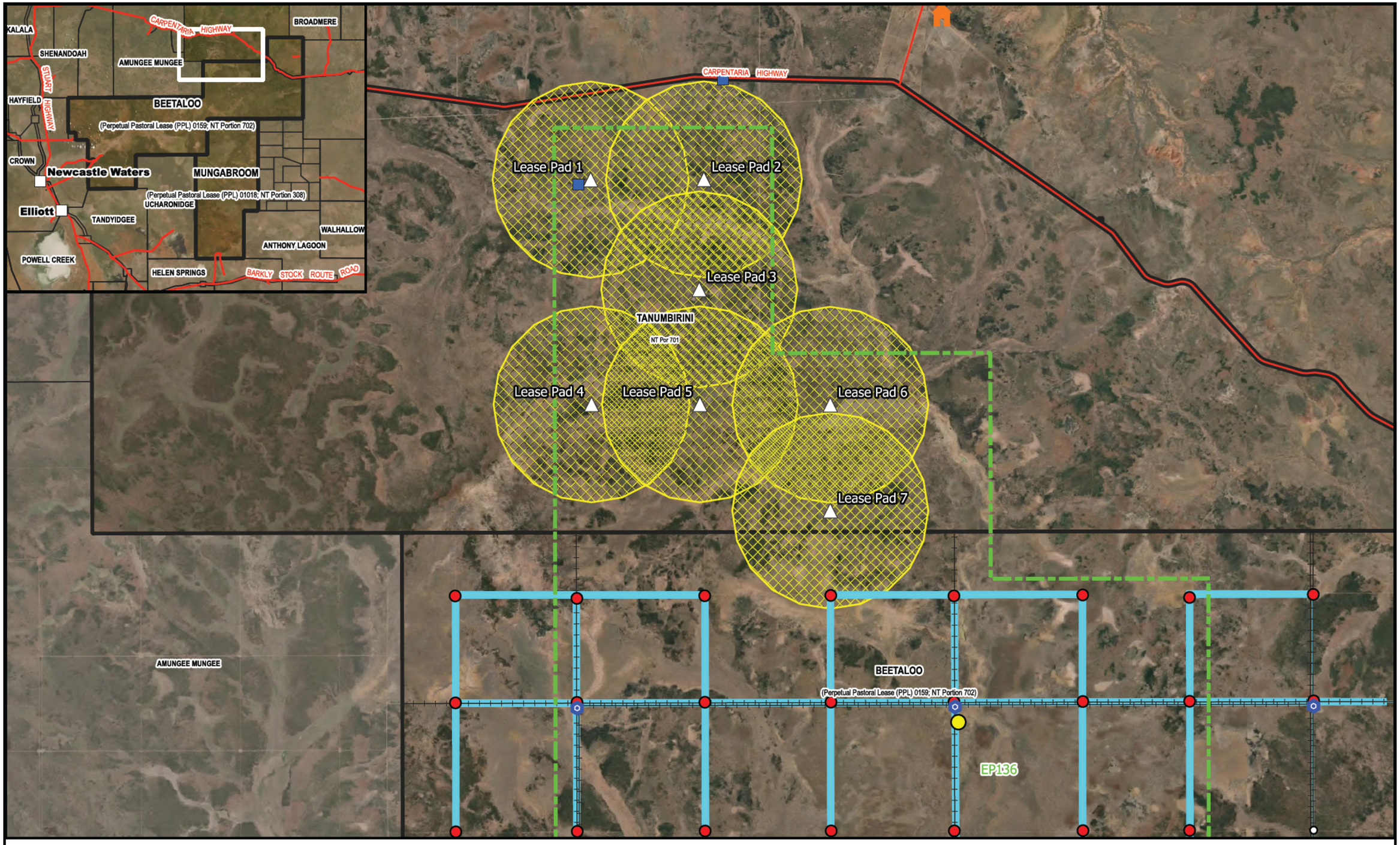
- Project Area (Beetaloo Station, (PPL 0159; NT Portion 702 (Mungabroom Station, (PPL 01018; NT Portion 308
- Cadastral Boundaries
- Cities / Towns
- Roads
- Homesteads

Property Infrastructure

- Water Outlets / Accumulation (Tanks / Troughs
- Water Outlets (Boreholes
- Water Accumulation (Poly Pipes
- Internal Fences

- Exploration Permits
- Sweetpea Petroleum (EP 136 & EP 143
- Petroleum Exploration Program Well Drilling, Hydraulic Fracture Stimulation and Well Testing Environment Management Plan (Project Area

BASE/



Exploration Wells EP136 -Tanumbrini Station and Beetaloo Station

0 2 4 6 8 km

Scale @ A3: 1 : 250000
Date: 12/11/2021
Drawn: Corey Taylor

N

DATA SOURCE:
Department of Environment, Parks and Water Security © Northern Territory Government;

- Project Area (Beetaloo Station, (PPL 0159; NT Portion 702 (Mungabroom Station, (PPL 01018; NT Portion 308
- Cadastral Boundaries
- Cities / Towns
- Roads
- Homesteads

Property Infrastructure
- Water Outlet (Water Tank / Troughs
- Water Outlets (Boreholes
- Water Accumulation (Poly Pipe
- Internal Fences
- Cattle Yards

Impacted Infrastructure
- Prohibited - Operation within 200m of a Water Outlet (Tanks/ Troughs
- Prohibited - Operation within 200m of a Water Accumulation (Poly Pipes

Sweetpea Petroleum EMP (EP 136 & EP 143)
- Seismic Lines Clearance Required
- Seismic Lines No Clearance Required
- Exploration Permit Sweetpea Petroleum (EP 136

Petroleum Exploration Program Well Drilling, Hydraulic Fracture Stimulation and Well Testing Environment Management Plan (Regulated Activities)
- Camp Options Sites
- Lease Pads
- Exploratory Well Impact Area (4 km

BASE/

Appendix B Expert Hydrogeologist Assessment of EMP

Hong Kong
Indonesia
Malaysia
Singapore

Jakarta, 22 February 2022
No : 004/ESC-GE/II/2022

Attention :

Mr Barry Taylor, Emanate Legal, representing
Yarabala Pty Ltd (ACN 001 832 944) as Trustee of the John Beetaloo Trust and BB Barkly Pty Limited (ACN 622 678 013) as trustee of the BB Barkly Unit Trust (Respondent)
Sweetpea Petroleum Pty Ltd ABN 42 074 750 879(Applicant)

The project

Sweetpea is planning to drill seven exploration and appraisal wells in the Beetaloo Basin over the next three years on Tamunbirini Station and impacting the northern part of Beetaloo Station. An EMP for Well Drilling, Hydraulic Fracture Simulation and Well Testing has been prepared in support of the application for approval. This is a short appraisal of deficiencies in the EMP with particular regard to groundwater.

Overview

Hydraulic fracking in the Beetaloo Basin comes with risks. Successful outcomes will lead to a full scale development which when combined with other Origin and Santos activities in this Basin will be a world class gas resource contributing substantially to greenhouse gas emissions. In turn this will exacerbate the already adverse effects from climate change with more extreme droughts, more severe storms, flooding; all these will without question impact the surface water and shallow groundwater regimes in the Beetallo Basin on which the cattle stations depend. Although this is not an aspect normally discussed in an EMP which is very focused and project specific, the outcomes of the recent COP 26 climate conference in Glasgow now require a detailed review of impacts of climate change. No such discussion is given. Greenhouse gas emissions merely refer to releases and flaring from the seven wells totalling about 150,000 tCO_2-e and therefore completely ignore the bigger picture.

The Northern Territory is potentially a large exporter of renewable energy, the SunCable project plans to export solar energy via Darwin to Singapore by sub sea cable. Ultimately renewable energy will overtake ventures such as the Beetaloo Basin gas developments.

There is no indication of what designates a successful flow or of the projected gas potential of the Beetaloo field, how many wells may ultimately be installed and their potential distribution. It is likely that ultimately there will be a network of horizontal wells underlying much of the Basin with the cumulative risks greatly exceeding those discussed in this EMP and severely impacting the sophisticated surface water and groundwater infrastructures in which the pastoralists have invested heavily and on which they depend.

Definitions

The term **freshwater** is used but not defined. According to the salinity/EC data for groundwater the ALB, GRF and Bukalara aquifers do not meet WHO drinking water standards. The GRF data below confirms this, total anions and cations are about 950 mg/l, well above the drinking water standard of 500 mg/l. They are suitable for livestock but that is not "fresh".

Aquifer	Gum Ridge Fm
Date Sampled	15/04/2015
E.C. (µS/cm)	1,432
Sulfate (mg/L)	151
Chloride (mg/L)	104
Calcium (mg/L)	126
Magnesium (mg/L)	53
Sodium (mg/L)	76
Potassium (mg/L)	10
Bicarbonate (mg/L)	426

The term **major fault** is not defined. It is useful to imply there are no major faults potentially affected by the seven wells to be fracked. But it is likely that lesser faults, however they may be defined, exist and may regenerate. It is Sweetpea's obligation to examine this further. Noticeably no map is presented in the EMP showing the distribution of faults. Regeneration of faults is not necessarily instantaneous, pressure can build up for a period of time until it is released and this may happen after well after fracking has been completed.

Risk Assessment

In accordance with AS/ISO 31000, a team of multi-disciplinary professionals conducted and reviewed the risk assessment for Sweetpea. There was an ecologist and environmental scientist on the team of advisers but no hydrogeologist despite its importance. Irrespective, both surface water and groundwater are identified as medium risk impact, most other activities are identified as low risk. However if we look at long term impacts extending during and beyond the actual operation of the wellfields then both surface water and groundwater become high risk impacts.

Groundwater

Within EP136 there are three regionally extensive aquifers the Gum Ridge Group and Anthony Lagoon Formation collectively known as the Cambrian Limestone Aquifer (CLA) and the Bakalara Sandstone. The Anthony Lagoon Formation is a fractured dolomite, dolomitic limestone, and fine sandstone. The Gum Ridge Formation conformably underlies the Anthony Lagoon Formation and is characterised as being fractured and karstic limestone. able 20. The CLA is a preferred water supply for pastoral, domestic and gas drilling. The Bakalara Sandstone is deeper and for that reason is seldom utilised. However it does constitute a considerable

resource which is likely to be more heavily exploited. There are genuine concerns that over the coming generations, not necessarily in the short term, the combined groundwater resources of these three aquifers will be adversely impacted.

The EMP is only focused on the short term withdrawals and does not address the longer term potential impacts. It is recognised that the water levels are deep, between 75 and 135 m below ground level. This is an indication that local recharge does not occur, it occurs around the margin of the Basin where the aquifers are closer to the surface. And it is near the margins of the basin that Sweetpea acknowledges that "major'" faulting is present. Neither Sweetpea nor other potential gas producers in the Basin have seen fit to finance a detailed evaluation of the groundwater regime preferring to rely on prior government studies. These studies have emphasised that the groundwater regime is not fully understood. As stated in EMP – "Groundwater flow at a local scale in the CLA and other aquifers in the project area are poorly understood, due to the absence of discrete groundwater level readings in each unit."

The additional information collected since the previous study from seismic and groundwater well installations merits an update.

Faulting

There is no fault map presented in this EMP. A previous review of the Origin EMP for Beetaloo Basin did show several faults within the area of exploration and it was suggested that several additional faults did exist. Sweetpea assert that no major faults have been identified I seismic data across the Beetaloo Sub-basin except along the Basin edges. They state, optimistically, that 2D seismic acquisition and lateral drilling prior to hydraulic fracture simulation is anticipated to confirm the absence of major faults but that unexpected complex faulting could occur. So these statements are contradictory, on one hand they say major faulting is not present and on the other hand they say it may be. They further state that induced fractures are modelled to stay within approximately 50 to 100 m of the horizontal well. This latter statement does not apply if faults undetected by lateral drilling are present. Such faults could be triggered beyond the 100 m radius nominated. Sweetpea at a minimum should provide a map showing distribution of faults in the sub-Basin, not just the "major" faults and concede that additional faulting possibly not recognised from 2-D seismic is present.

Seismic

Sweetpea acknowledge that seismic activity is associated with fracking. They propose to monitor through Geoscience Australia's Beetaloo Sub-basin Seismic Monitoring Project (GABMP) and an induced seismicity traffic light system will be implemented.. Traffic light systems define when operations need to be adjusted if an event of a certain magnitude is exceeded. It will be useful to understand further what magnitudes can be anticipated based on previously completed exploration and appraisal wells in the Beetaloo Sub-Basin. And the potential impacts from magnitude 1, 2 etc. Of particular concern are potential regeneration of faults and loss of well integrity.

Well Integrity

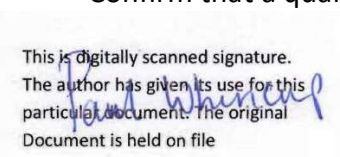
It is proposed to install Compliance (CMB) and Intervention Monitor Bores (IMB) at each site to determine if there are any losses into the Anthony Lagoon and Gum Ridge Formation aquifers. The deeper Bukalara Sandstone is an equally important aquifer, indeed its groundwater is less saline than the two overlying aquifers. It would be the first aquifer impacted by fracking fluids, hypersaline groundwater and backflow. This aquifer should also be included in the CMB and ICB monitoring programme. Drilling of the seven wells should not be allowed to proceed until approval is given for Bukalara Sandstone monitoring.

At first glance, apart from Bukalara Sandstone monitoring, the well integrity programme appears very sound. However it is possible that seismic activity could reduce the integrity of the outer cement grout seal allowing saline contaminated groundwater to enter the shallower aquifers. This has not been discussed. Seismicity is likely to continue after well testing is completed and when subsequent seismic events are recorded the well integrity testing and IMB, CMB monitoring programmes should be continued.

Action Plan

The following actions need to be addressed.

- Provide explanation of “fresh” water and “major” fault.
- Advise the criteria for designating an exploration or appraisal well as successful.
- Advise the longer term full scale exploitation of the gas field should this programme be successful, number and siting of wells, footprint of subsurface horizontal wells.
- Proximity and cumulative impact with other similar projects in the Beetaloo Basin.
- Include short term and long term climate risks in the EMP firstly under current conditions and also long term based on full scale operation and accumulative gas emissions from the whole Basin.
- Commit to construction of Intervention and Compliance wells at each of the seven sites into the Bakalara Sandstone.
- Commit with other operators in the Beetaloo Basin to funding additional study of the groundwater regime in the Basin
- Fault Maps – the need to present in order to understand any risks and complete a proper risk assessment.
- Provide commitment to checking well integrity and IMBs/CMBs after completion and then during operation of the future wellfield.
- Explain more clearly what actions are proposed should complex faulting and potential seismic activity be identified during fracking.
- Confirm that a qualified hydrogeologist was involved in the risk assessment.



Paul Whincup
Principal Hydrogeologist

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Paul Whincup

Principal Hydrogeologist

Education

University of St. Andrews, Scotland, B.Sc. (Hons) Geology with Chemistry (1962)

Work Experience

Geological Survey of Western Australia (hydrogeologist and engineering geologist), 1963-1970;

Geotechnics (Aust) Pty Ltd (chief hydrogeologist and administrative manager), Perth, 1970-1973;

Groundwater Resource Consultants, Australia, Founder and Managing Director, 1973-1984. Acquired by Dames & Moore in 1984;

Partner and Vice President Dames & Moore 1988 to 2000 including four years as manager of the London office (1991 to 1994) leading the soil and groundwater remediation groups then General Manager Asia (1994 to 2000) based in Singapore;

General Manager Asia and Senior Vice President URS, 2000-2002;

Technical Director ERM Asia Pacific 2002-2013 with focus on soil and groundwater remediation; based in Hong Kong

ESC 2013 –present; Principal Hydrogeologist based in Jakarta.

Summary

Paul Whincup has more than 50 years international experience in Australia, Asia, UK, Europe, Middle East, the Indian subcontinent, Africa and South America with project involvement in over 40 countries. He initiated the first major groundwater remediation projects in Australia in 1974 and expanded that discipline in the UK, the Middle East, Europe and the former USSR before returning to Asia in 1994 to address the growing concern with soil and groundwater contamination. He has completed major groundwater remediation projects in Thailand and Taiwan and is currently Technical Adviser for the Kallang Gasworks soil and groundwater remediation project, the largest such remediation project in Singapore.

Professional Affiliations and Registrations

- Former President, International Association of Hydrogeologists, Australian Chapter
- Former President, Australian Drilling Industry Association
- Former Director, Australian Government Drilling Industry Training Committee
- Formerly on Editorial Board of International Journal of Applied Hydrogeology and Journal of Land Contamination and Reclamation

Selected Projects

Contaminated Site Management

- Technical Adviser to the Singapore Land Authority Kallang Gasworks remediation project in Singapore involving in situ and ex situ thermal desorption and groundwater treatment.
- Project Director for multiyear groundwater investigation and remediation at the Sirikit Oilfield in Central Thailand for Shell Thailand.
- Groundwater remediation of VOCs and SVOCs at Formosa Plastics facilities in Taiwan using innovative groundwater interceptor and recirculation wells.
- Mercury remediation at the Hindustan Lever mercury facility at Kodaikanal, Tamil Nadu, India including negotiations with Pollution Control Board, Greenpeace and Supreme Court Technical Review Committee.
- Remedial Action Plan for the Asian Rare Earth plant in Ipoh Malaysia for Mitsubishi Chemicals including demolition of radioactive contaminated buildings and disposal of radioactive sludge.
- Consultant to the Alcoa alumina refineries at Kwinana, Pinjarra and Wagerup; the Western Mining Corporation (now BHPBilliton) nickel refinery in Western Australia and the BHPBilliton alumina refinery at Worsley.
- Expert adviser to the Indonesian Government on groundwater management and groundwater pollution control. Preparation of legislation for technical guidelines for environmental impact analysis.
- Consultant to the copper-lead-zinc operations at Hilton Mine on groundwater contamination from TSF and groundwater remediation at Townsville Copper Refinery - Mount Isa Mines in Queensland.
- Consultant to the Freeport/Mitsubishi copper smelter at Gresik, Java and proposed lead smelter for Western Metals in Cilegon, West Java.
- Consultant to PT Timah for alluvial tin mining and smelting on Billiton Island, Indonesia.
- Development of quantitative and qualitative groundwater model of the Freeport mine lowlands tailings disposal area for input to the Ecological Risk Assessment
- Environmental and groundwater pollution studies. In Queensland (mineral sand mining, mine water disposal), Western Australia (mine water disposal, leakage from tailings ponds of acid and alkali residues, deep well injection of toxic wastes, evaluation and investigation of radioactive waste disposal sites) and Victoria
- Regional studies of groundwater pollution from large industrial complexes and development of appropriate management and legislative guidelines.
- Principal consultant. Groundwater pollution control and waste disposal studies for many industrial and processing facilities in Australia including chemicals, fertilisers, cement, pesticide, hydrocarbons and mineral processing (aluminium, nickel and steel).
- Project Director and Specialist Ground water Consultant: Master Plan Study for Rural Water Supply, coastal region of Sarawak.
- Project Director for benzene contamination study in soil and groundwater for major petrochemical plant in Jubail, Saudi Arabia.
- Remediation of leakage into groundwater from the effluent pond at the Western Mining Corporation (now BHP Billiton) nickel refinery in Western Australia
- Expert Consultant to the Directorate of Environmental Geology, Indonesia (ADB Loan No 641-INO) advising on waste disposal in Bandung, site selection for the Jabodetabek hazwaste facility and groundwater pollution.
- Project Director: determination of appropriate soil and groundwater clean-up criteria for the petroleum sector in Poland for the European Bank for Reconstruction and Development.
- Project Manager for emergency response for major tire fire in Western Australia, involving interception of pyrolysis oils, check dams, clean up, and incineration of pyrolysis oils in cement factory kiln.
- Project Director for investigation of floating product and development of remediation strategy at large oil refinery Naples Italy.
- Expert Consultant to the Black Country Development Corporation in Central England. Investigation and remediation strategies and preparation of investor reports for a large area of industrial land, including the site of the world's first blast furnace.
- Project Director for investigation and remediation of a specialty chemical plant site in Southern England used as an industrial site for nearly 400 years. Including health and ecological risk assessment to determine and agree appropriate remediation criteria with Regulatory and Planning Authorities.
- Project Director and Lead Consultant for Environmental Site Assessment and Remediation of mercury contamination for Hindustan Lever facility in Tamil Nadu, India including risk assessment and interaction with Expert Panel appointed by Supreme Court.
- Project Director 1994-2001 for remediation of salt contaminated groundwaters derived from Non-Hazardous Oilfield Waste at the Sirikit Oilfield, Thailand for Thai Shell.

- Project Director for QA/QC of remediation of oily sludge by thermal desorption from the Sunggai Bera Holding Basin for Shell Brunei.
- Project Director for remediation of PCB contaminated soil by thermal desorption, Makati Manila, and Philippines for Rockwell Land Corporation.
- Environmental assessment of various electrical, electronic assembly, refrigerator and air conditioner plants in India (Maharashtra, Karnataka and Punjab States).
- Investigation and remediation of groundwater contamination at the Alcoa Kwinana red mud residue ponds.
- Chevron Indonesia. Peer Review of groundwater studies in support of investigations of legacy sites in Duri Field Sumatra.
- Environmental audits and drilling/testing for volatile/organic compounds/heavy metals at semi-conductor manufacturing facilities in Kuala Lumpur and Singapore.
- Remediation of floating product at the BP Oil Refinery at Kwinana Western Australia.
- Project Director: evaluation and ranking of waste treatment, storage and disposal sites in Italy, Spain and Portugal on behalf of multinational company.
-

Water

- Project Manager – Gnangara Mound Groundwater Resource Development Plan, Environmental Review and Management Plan, Western Australia, Perth Urban Water Balance Feasibility Study.
- Principal Hydrogeologist: Master Plan Studies for Cimanuk River Basin, Cisanggarung River Basin and South West Mountains, in West and Central Java (these studies included hydrogeological assessment of groundwater supplies from volcanoes in West and Central Java).
- Expert witness to Sydney Water Board for Inquiry into Mining Under Stored Waters.
- Rural Water Supply studies at Zamboanga Del Sur, Philippines, coastal region of Sarawak, Malaysia; Home Island and West Island, Cocos-Keeling Group, Australian Territory; aboriginal settlements at Laverton, Derby and Port Hedland, Western Australia; remote station, farms, mining settlements and construction camps, Western Australia; East Kalimantan transmigration project, Indonesia.
- Expert adviser to the Indonesian Government on groundwater management and groundwater pollution control. Preparation of legislation for technical guidelines for environmental impact analysis.
- Principal Hydrogeologist for projects for feed lot, agricultural and range land development studies in Saudi Arabia (Jeddah, Mecca, Taif, Riyadh, Qassim, Hail, Buraydah, Dharan); Oman, Syria; United Arab Emirates (Abu Dhabi, Dubai, Sharjah, Fujairah); Borno State, Nigeria; El Arish; Sinai Desert, Egypt; Algeria (Ksar Chellala Steppeland regeneration project), Jordan; Pakistan, (Sind, Baluchistan and Punjab Provinces).
- Project Manager. Surface Water and Groundwater Expert for Weda Bay Nickel ESIA, Halmahera, including development of water management plans.
- Sagea Lagoon and adjacent limestone deposits on behalf of Weda Bay Nickel, Halmahera, in relation to proposed limestone mining activity including preparation of Water Management Plans.
- Project Director for Chevron Pacific Indonesia for evaluation of alternative water resources (groundwater, produced water, surface water, recycling of wastewaters) and management strategies for replacement of existing Rumbai River source for Chevron Duri operations.
- Peer Review and Groundwater expert for Shell Tiaohu oil shale project in Xinjiang China.
- Groundwater expert for screening and scoping assessment for Chevron Guizhou shale gas project in Sichuan, China
- Integrated Water Study for three CBM Production Sharing Contracts in Central Kalimantan for BP Kapuas.
- Team leader for preliminary baseline studies for BP of prospective CBM areas in South Sumatra and South Kalimantan.
- Technical Groundwater Expert for BP Tangguh Expansion Amdal.
- Exploration, development and management of industrial mine and golf course water supplies in Australia and Indonesia (Java, Kalimantan and Bali).
- Dewatering studies at the Muja open cut coal mine, Western Australia, Hilton Mine, Mt Isa, Queensland, Zeehan Mine – Tasmania, Huntly West Mine, New Zealand, Agnew Mine, Western Australia, Greymouth Coal Mine, New Zealand, Kaltim Prima Coal Mine, Kalimantan.
- Evaluation of groundwater supply for Chelyabinsk copper project, Southern Urals, Russia for Eureka Mining.
- Peer review of groundwater aspects of ESHIA for MAK copper molybdenum project in Mongolia for EBRD.
- Water resource investiagations for Sasol-Shenhua indirect coal gasification projects in Ningxia and Yulin.
- Expert consultant on water quality as input to the ESHIA for the 3,000 MW Purari hydropower project in PNG.

- Hydrogeological and water balance studies for areas of karstic limestone proposed for mining in Halmahera, Indonesia including spring mapping and lagoon profilng
- Peer Review for Alcoa Pinjarra alumina refinery, Western Australia; Kabata, Guinea; and Lelydorp, Surinam
- Prefeasibility and Feasibility Master Plan studies for water supply for the coastal area of Sarawak, East Malaysia, comprising rainwater, surface water, peat, water and groundwater evaluation and planning.
- Project Manager/Principal Consultant for town water supply schemes at Geelong, Victoria; Cilacap, Indonesia; Bunbury, Port Hedland, Perth and mining towns in Western Australia.
- Alcoa Pinjarra Alumina Refinery, Western Australia. Peer review of conceptual and numerical models in support of application for increased groundwater abstraction to 6,500 GL/a.
- Donggi Senoro LNG. Peer Review of hydrogeological studies to assess compliance with Equator Principles and suitability of groundwater for project water supply.
- Coca Cola Indonesia. Hydrogeological studies and determination of wellhead protection areas for four facilities in Java and Sumatra
- Chevron Indonesia. Peer Review of groundwater studies in support of investigations of legacy sites in Duri Field Sumatra.
- BHPBilliton Beenup Mineral Sands Project, SouthWestern Australia. Peer Review of Groundwater Models to assess fate and transport of sulphate plumes in groundwater in relation to Scott and Blackwood Rivers and preparation of closure strategy.
- Chairman of Peer Review Committee for the Groundwater Models for the SouthWest Yarragadee Formation aquifer in Western Australia on behalf of the Water Corporation.
- Expert water consultant to the International Finance Corporation (IFC – World Bank Group) and European Bank for Reconstruction and Development providing Due Diligence for the water supply development associated with the development of the Oyu Tolgoi mine in Mongolia.
- Hydrogeological and hydrological baseline studies and environmental/social screening for coal bed methane projects in Sumatra and Kalimantan, Indonesia, over areas of thousands of km^2.
- Investigation and characterisation of groundwater regimes for Pilipinas Shell Production Company at Tabangao, Pililla and Pandacan Refineries and for Shell Pilipinas Exploration at the Malampaya Onshore Gas Processing Facility.

Sam Moorhead
on behalf of Lock the Gate Alliance

DEPWS Petroleum Operations Unit
Northern Territory Government

17 June 2022

SUBMISSION - Sweetpea Petroleum EP 136 - Well Drilling, Hydraulic Fracture Stimulation and Well Testing Environment Management Plan

Lock the Gate Alliance welcomes the opportunity to comment on the second version of the EMP submitted by Sweetpea Petroleum in relation to its proposed work programme for EP 136.

Our previous submission on the EMP detailed multiple issues with Sweetpea's exploration program and the environmental risk assessments and mitigation plans contained in the EMP. In the updated EMP, Sweetpea 'assess the merit of' and 'respond to' our concerns, along with other issues raised by various community and business stakeholders.

As set out below, Sweetpea's response to the issues we raised in our submission included:

- Deleting or amending parts of the EMP we had pointed out as problematic without acknowledging it or engaging with the substance of the issue raised, especially in the Chemical Risk Assessment;
- Failing to meaningfully engage with the analysis and evidence put forward in support of our concerns; and
- Presenting unfounded assertions about the climate implications of its project as fact, without providing any evidence to support them.

As such, most of our concerns remain unchanged - beyond the added layer of misapprehension created by Sweetpea's tokenistic response to its stakeholders' concerns, which raises questions about the sincerity of its commitment to acting as a responsible corporate citizen in the NT.

This additional concern is heightened by the way in which Sweetpea, and parent company Tamboran Resources, have acted towards Traditional Owners, Aboriginal custodians and the broader community in recent months. Tamboran's refusal to appear before the Senate Standing Committee demonstrated a fairly extraordinary disregard for Australian governance and corporate accountability. Meanwhile, its response in the new EMP to concerns raised by senior Aboriginal people and AAPA about impacts to sacred sites along Newcastle Creek - '...we see no possibility of impacts to sacred sites'[1] - is arrogant and disrespectful. Sweetpea repeatedly states that it takes its stakeholder obligations seriously, but these statements are completely belied by its actions. We urge the Minister to consider whether the public interest and the NT community are best served by condoning this company's actions.

We also wish to note that no Greenhouse Gas Abatement Plan is included in the EMP documents available for public comment. Sweetpea's predicted emissions exceed the 100,000t/fy threshold, and as such they 'should submit a GGAP for assessment as part of the project's usual Environment Management Plan assessment process'.[2]

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[1] See p x.
[2] See guidance on the Large Emitters Policy at <https://depws.nt.gov.au/environment-information/large-emitters-policy/large-emitters-policy?SQ_VARIATION_1042148=0>. Multiple emails were sent to the EMP submission email address to inquire whether a GGAP had been submitted, with no response received.

Stygofauna

In our first submission, we noted that while Sweetpea cite the 2020 stygofauna study completed by CSIRO/GISERA scientists (Rees et al, 2020), its impact assessment relies on generic factors from a different paper (Hose et al, 2015), and that its conclusion that impacts to stygofauna would be minimal was not actually supported by that paper.

In response, Sweetpea state that the Rees et al study 'noted Stygofauna sampling identified the same species across the full extent of the CLA overlying the Beetaloo Sub-basin, thus it is unlikely that any localised impact to stygofauna would be considered significant'.[3] This completely misrepresents the study's findings. The study did find genetic similarity between organisms found at geographically distant sites, but this was concluded to suggest a high degree of groundwater connectivity within the CLA.[4] The study certainly did not make any assertions about the 'insignificance' of impacts to stygofauna arising from the fact that the same species are found at other locations - which is unsurprising, given that this is hardly an ecologically robust understanding of 'impacts' to fauna. Indeed, the authors instead recommended further research to understand the implications for biodiversity of surface spills given this evidence of connectivity.

The EMP does not acknowledge the extraordinary subterranean biodiversity identified in the CSIRO/GISERA study, or discuss the implications of its exploration program for such biodiversity.

Chemicals

In our first submission, we pointed to inaccuracies in the Chemical Risk Assessment, where it was contended that none of the assessed chemicals were bioaccumulative and that the tier 1 assessment involved an 'evaluation of the environmental hazard' of each chemical. In fact, several chemicals were described as actually or potentially bioaccumulative, and the tier 1 assessment was limited to an assessment of the risk posed to workers.

It appears that either a new CRA has been prepared for this EMP - possibly because Sweetpea has now actually determined the chemicals it intends to use - or the inaccurate sentences we identified have merely been removed from the CRA. We hope that it is the former scenario.

We note that the EMP and the new/revised CRA also now refer to a risk assessment based on whether chemicals are 'toxic *and* persistent *and* bioaccumulative'.[5] No explanation, source or justification is provided for this standard beyond the contention that 'the assessment of PBT is consistent with Australian risk assessment methodologies'.[6] It is unclear whether a 'toxic' chemical, for example, would still be considered to pose a risk to fauna or groundwater quality - and, if not, why not.

Climate change impacts

Sweetpea's response in relation to the climate change impacts of its project is merely rhetoric unfounded by evidence or analysis. Sweetpea does refer to the IEA 'Net Zero' scenario, but fails to mention that no new gas fields are developed in this scenario - including the Beetaloo. This response is nothing more than opinion put forward as fact. In its current form and without a GGAP, the EMP remains inadequate to address or mitigate the damage to the climate caused by the project.

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[3] See p 116 (issue 6 in the stakeholder responses table).
[4] Gavin Rees et al, 'Characterisation of the stygofauna and microbial assemblages of the Beetaloo Sub-basin, Northern Territory' (December 2020), GISERA project number W18, pp 48-51.
[5] See, e.g., EMP, p 51; Appendix C, p 3.
[6] See EMP, p 120.

Biodiversity

In our first submission, we noted that no explanation or evidence is provided for multiple conclusions about the purportedly minimal impacts to threatened species and biodiversity in the EMP. We also raised concerns that the Rehabilitation Plan relies almost entirely on 'natural revegetation', a completely inadequate approach to restoring the collapsing ecosystem of the Sturt Plateau, and that the Plan's 'final success criteria' is 10-20% canopy cover, but current coverage is 50-80%.

Sweetpea does not engage with these concerns, merely maintaining that the risks and impacts are ALARP without further justification. It states that the EMP 'will require assessment and approval by … NT EPA', but as it has refused to refer the EMP to the EPA for assessment, and the EPA has not called it in, this is not true. We reiterate our concerns regarding the biodiversity impacts of this project.

Thank you for considering our submission,

Sam Moorhead
On behalf of Lock the Gate Alliance.

[redacted]

From: Nurrdalinji Contact <contact@nurrdalinji.org.au>
Sent: Monday, 20 June 2022 12:44 PM
To: SweetpeaPetroleum DEPWS
Subject: Comment on Sweetpea Petroleum Pty Ltd (Sweetpea) EP 136
Attachments: 220620 Comment on Sweetpea Petroleum Pty Ltd (Sweetpea) EP 136 Drilling Fracture Stimulation and Testing EMP Beetaloo Sub-basin NT dated May 2022.pdf; 220210 Comment on Sweetpea Petroleum Pty Ltd (Sweetpea) EP 136 Beetaloo Sub-basin NT (1).pdf

Please find attached our Comment to Drilling Fracture Stimulation and Testing EMP Beetaloo Sub-basin NT and Submission of February 2022 referred to therein.

Regards
Johnny Wilson
Nurrdalinji Chairperson

NURRDALINJI NATIVE TITLE ABORIGINAL CORPORATION
ICN 9392
chair@nurrdalinji.org.au

DEPWS Petroleum Operations Unit
PO Box 3675
Darwin NT 0801
By email: sweetpea.ep136@nt.gov.au

20 June 2022

To whom it may concern,

Comment on Sweetpea Petroleum Pty Ltd (Sweetpea) EP 136 Drilling Fracture Stimulation and Testing EMP Beetaloo Sub-basin NT dated May 2022

Overview

Nurrdalinji Native Title Aboriginal Corporation (Nurrdalinji) would like to make the following additional comments to that made in our submission to the first version of this EMP, dated 22 February 2022. There is no change in this revised EMP to suggest our concerns as identified there have been addressed. You will find our February 2022 submission attached.

We ask that you do not approve this EMP as it does not comply with all the requirements for approval set out in the *Petroleum (Environment) Regulations 2016,* as explained below, and because Sweetpea have not properly consulted with us.

Since making our concerns about Sweetpea's first draft EMP known to you in February 2022, our members have three times visited Tanumbirini cattle station where Sweetpea's fracking activities are underway. There we have witnessed with our own eyes the threats of this industry to our water, sacred sites and country. This has confirmed and only deepened our concerns about the risks and what will be lost to us and future generations if Sweetpea fracks our country. We have publicly vowed to continue to work to raise the alarm about how this activity will devastate our country, water and culture.

Specific new concerns

Juukan Gorge-like damage looms to sacred site/Newcastle Creek

We are concerned that proposed works at the crossing of Newcastle Creek are not currently authorised under C2020/072. We have written three letters to AAPA in May and June 2022 outlining our fears about work threatening Newcastle Creek. In particular, we have set out what we believe may be an inaccurate depiction by Sweetpea of Newcastle Creek Restricted Work Area 2.

We are worried about possible changes Sweetpea has made to the maps/depiction of Restricted Work Area 2 (RWA2), which the Certificate has designated in an effort to protect Newcastle Creek from damage. In the maps Sweetpea has provided to the DEPWS for the purpose of seeking approval to undertake regulated activities within EP136, it appears

Sweetpea has in its respectively approved EMPs for Seismic and Civil Construction shortened RWA2, presumably to enable clearing of vegetation across Newcastle Creek as part of Sweetpea's bid to create an access way over the creek.

Critically, AAPA has confirmed in its correspondence with us, in a letter dated 3 June 2022, that, "*The same will apply for proposed works at the crossing of Newcastle Creek,* ***which is not currently authorised under C2020/072".***

It is our understanding that, according to the Authority Certificate, Sweetpea cannot clear or damage anything in the creek. We understand from Rallen Australia that clearing for the seismic survey, which may also include repurposing the seismic line into an 18m road, is to commence from as early as the 24th June 2022. We understand that if this happens Sweetpea will be in breach of Authority Certificate C2020/072 which states "there shall be no vegetation clearing or ground disturbance of any kind within RWA2 for the purpose of using said pre-existing tracks for transit".

With Sweetpea proposing to construct a track to cope with wet weather, this will demand building the track up to between 1-2 metres above the country as it exists now. This will effectively present a barrier, impacting the way water flows across our country and interrupting the songlines which exist there. It will also impact water holes associated with Newcastle Creek, and the sacred sites that are water holes within the 4km x 4km grid.

We fundamentally disagree with Sweetpea's assessment at p. x, that work on the western access track over Newcastle Creek only carries a 'medium' risk. If work is approved as Sweetpea currently plans, and our sacred sites at Newcastle Creek are damaged, the Minister will be overseeing and effectively sanctioning an incident similar to Rio Tinto's recent destruction of Juukan Gorge.

To further elaborate on the significance of this area to us, we refer to testimony put by local Aboriginal groups to the NT Fracking Inquiry, contained in a chapter of its final report, Aboriginal People and their Culture. This states: *"According to Aboriginal tradition, the aquifers underlying country which may give rise to springs and other naturally occurring water sources can be associated with the travels of ancestral beings and link neighbouring Aboriginal groups, connecting people across the landscape. In the area surrounding the Beetaloo Sub-basin, for example, these connections find expression in the kujika song cycles.*

Kujika are central to the major ceremonies linking Aboriginal nations and language groups across the region. These songs link people with sites in the landscape and require that a broader group of Traditional Owners and custodians be consulted, not just the group associated with the land directly above the areas proposed for any shale gas wells.

The kujika reinforce the concept of mangalalgal, or "the way of the dreaming", which is an explicit imperative to honour and maintain cultural traditions. Traditional Owners have submitted that they are connected with neighbouring Aboriginal groups by "underground culture."

In conclusion, we are very concerned that the road could have an impact on the Newcastle Creek area which is part of an important songline.

We call on the Minister to urgently stop any work by Sweetpea at this site occurring, which we understand may begin as early as this Friday June 24, until this has been resolved.

Unauthorised extraction of water

In May 2022 we wrote to AAPA asking that they clarify conditions of Authority Certificate in relation to water extraction for fracking. We pointed out that Newcastle Creek is subject to an Authority Certificate and that Sweetpea admits in its Draft Fracking EMP for EP 136, that area has 'known cultural sensitivities'. We pointed out that it appears that the above Certificate does not expressly consider or provide for extracting the extremely large amounts of water that will be required for drilling and fracking.

We are concerned because the water that runs in Newcastle Creek and associated water holes belongs to its Aboriginal owners, and it has since the beginning of time. Our cultural heritage and our sacred sites are so important to us — our songlines, our dreaming and our water. Without this, we are nothing. We all share the water on and under the ground. We have a responsibility to look after that water. This is a big reason why we do not want fracking. We can't afford to have fracking destroy our water, animal life or dreaming.

AAPA has replied back to us, in a letter dated 3 June 2022, and confirmed that this is the case:

> *2. Clarification of the conditions of Authority Certificate C2020/072*
>
> *We note your concerns about water and your query about the application of Authority Certificate C2020/072 to the extraction of water for drilling and hydraulic fracturing. We confirm that the certificate only applies to water extraction from existing bores water for rehabilitation/camp operations.The approval by the NT Environment Minister of the Environmental Management Plan is reliant on a valid Authority Certificate for the substantive water extraction associated with hydraulic fracturing.*

This creates another reason why this draft EMP cannot be approved because in relation to *Petroleum (Environment) Regulations reg 9(1)(d)* there is not a consistent AAPA Authority Certificate with respect to the use of water for fracking and drilling.

Lack of consultation and informed consent

Since our submission in February 2022, where a failure to consult with us was highlighted, Sweetpea has not proactively reached out to us to discuss our concerns.

We also see Sweetpea has noted in this revised EMP that "AAPA have raised, formally, a more recent desire to undertake further consultation regarding water extraction from water bores covered under AC2020/072" yet Tamboran considers this is not needed for approval of the EMP, claiming:

1. The conditions of AC2020/072 already require the protection of sacred sites associated with water holes in the Newcastle Creek region;

2. The Civils & Water Bore EMP is already approved and approves the use of greater than 100 ML of water extracted under the approved Water Extraction Licence (GRF10346); and

3. The NLC have confirmed that consultation with custodians regarding the proposed exploration and appraisal program has been completed as per the relevant Exploration Agreement.

Sweetpea's attempt to minimise the expected impact on water which is Traditional Owners' duty to protect is insulting. Consultation should occur, including with Nurrdalinji.

Nurrdalinji has also not to date been provided with a copy of the "independent" water study commissioned by Sweetpea which it says it will provide to stakeholders (p. viii).

It does not appear from Sweetpea's revised draft EMP, including its Stakeholder Engagement Log at Appendix D, that Sweetpea has in fact conducted the delayed "custodian consultations" regarding work on the pastoral crossing over Newcastle Creek which intersects with a Restricted Work Area, which Sweetpea made a promise to conduct in early 2022 in its first version of EMP 136. The revised EMP states at p. ix:

"Sweetpea have been engaged with AAPA throughout 2021 to seek authority to undertake these minor works at this crossing to ensure it is suitable for use during wet weather, however, due to COVID19 and other operational delays the custodian consultation will now occur in early 2022."

Some people who were originally consulted about this potential work are very old and did not receive any information in their own language or with reasonable access to advice and support about the nature and risks of the exploration proposals and agreements. A majority of our people still say they do not have enough information about fracking plans on country and its potential impacts to make informed decisions on. The impacts on our culture have not been properly assessed. People are also concerned about the divisions it is causing within families and communities.

Conclusion

We, the First Nation people and Traditional Owners from the Beetaloo Basin, feel that our voices to date have not been heard.

Our hearts are heavy with the knowledge that there is a real risk to our sacred sites, water and country from Sweetpea's operations. We do not believe that either under existing Australian law, or as a matter of respect for our culture, that this EMP should be approved.

In addition to our concerns outlined we seek your government's support, as an emergency, to change the Top End (Default) PBC arrangements that continue to enable the Northern Land Council to lock us into arrangements that we do not want.

Yours sincerely,

Johnny Wilson
Chairperson

[redacted]

From: Graeme Sawyer <graeme@protectcountrynt.org.au>
Sent: Monday, 20 June 2022 3:00 PM
To: SweetpeaPetroleum DEPWS
Subject: see attached
Attachments: Sweetpea EMP response.docx

Best regards,

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PROTECT COUNTRY ALLIANCE
FROM THE DESERT TO THE SEA, UNITED FOR A FRACK-FREE NT

Submission concerning Sweetpea EMP EP 136 proposal revised.

Executive Summary

The fracking EMP is still inadequate and should not be approved until its many shortfalls are addressed. Obviously this EMP is in breach of the climate goals for the future and attempts to reduce fossil fuel use but it also has many flaws.

One very major concern is the continuing failure of the government and the EPA to address the significant concerns and growing evidence relating to the impacts of fracking on groundwater.

The Pepper inquiry said that its 135 recommendations could not be relied upon in relation to groundwater. They said the science needed to be done from the SREBA process before a final risk assessment could be made. This has not been done and yet we have increasing evidence of issues with groundwater.

It has been a mistake to allow exploration to continue in light of this scientific uncertainty.

As an example, the cumulative impact of loss of drilling fluid during the drilling of vertical well components needs to be properly researched and understood, especially in light of the implications for dissolved oxygen levels, bacterial assemblages and the implications for newly discovered stygofauna species and the indications biocides are in the drilling fluids. The precautionary principle dictates that the approvals cannot be made until these uncertainties are understood. Sweetpea do not have authority to pollute groundwater during drilling with biocides and other compounds.

Recommendation 7.11 has not been properly implemented and special provision must be made to ensure that multi-level sensors are places in the monitoring bores with at least enough sensors to cover the top, middle and lower levels of the monitoring bores.

With evidence of increasing methane levels in groundwater, see figure 1 below, there is an urgent need for an open to the public Environmental Impact Study to be conducted by the EPA.

Groundwater

The preliminary water studies have shown several key factors that greatly increase the risks fracking poses to the region of the Cambrian Limestone Aquifer (CLA)

SREBA has not been completed and Sweetpea's fracking should not be allowed to proceed in the absence of this essential baseline data. However, the findings of preliminary stygofauna studies for the SREBA[1] have been released and include:

- That stygofauna are present in the Cambrian Limestone Aquifer ('CLA') formations of the Beetaloo Sub-basin

- The CLA is home to at least 11 species of stygofauna previously unknown to science, including a relatively large predatory shrimp species (indicating a complex multi-layered food web)

- The genetic similarity of the *Parisia unguis* shrimp species found at sample sites more than 300km apart adds to existing evidence of the interconnectedness of aquifers in and adjacent to the Beetaloo Sub-basin and along with the flow data from the water studies[2] show that pollutants can move over a significant distances and quite quickly

In an area such as the Beetaloo Sub-basin the availability of groundwater, and its quality, are essential factors in supporting the ability of people to live in the region and the region's ability to support a range of agricultural practices. The consequences of the inability to use this groundwater would be catastrophic for the region and those connected areas via the regional underground flows.

Stygofauna are a very important element of groundwater and we now know there are extensive and unique stygofauna assemblages in the underground waterways in the Bettaloo Sub-basin. Their probable role in groundwater quality shows risks to them could have very significant implications.

> *the links between biodiversity, ecosystem function, and ecosystem services in groundwater are unknown. In some aquifers, feeding, movement and excretion by diverse assemblages of stygofauna potentially enhance groundwater ecosystem services such as water purification, bioremediation and water infiltration. Further, as specific taxa apparently play 'keystone' roles in facilitating ecosystem services, declines in abundance or even their extinction have serious repercussions.* [3]

Stygofauna are adapted to conditions of constant temperature, no sunlight, and low nutrient (particularly carbon) and oxygen content in the groundwater environment.

There is clear evidence that pollutants are being added to these underground systems when drilling wells and there is further evidence that the fluids being injected into these underground water

1 Gavin Rees et al, 'Characterisation of the stygofauna and microbial assemblages of the Beetaloo Sub-basin, Northern Territory' (2020) GISERA project W18.

2 Huddlestone-Holmes CR, Frery E, Wilkes P, Bailey AHE, Bernadel G, Brandon C, Buchanan S, Cook SB, Crosbie RS, Evans T, Golding L, Gonzalez Dda, Gunning ME, Hall LS, Henderson B, Herr A, Holland K, Jarrett A, Kear J, Kirby J, Lech M, Lewis S, Macfarlane C, Martinez J, Northover S, Murray J, O'Grady A, Orr ML, Owens R, Pavey C, Post D, Sundaram B, Rachakonda P, Raiber M, Ransley T, Tetreault-Campbell S and Wang L, (2020) Geological and environmental baseline assessment for the Beetaloo GBA region. Geological and Bioregional Assessment Program: Stage 2. Department of the Environment and Energy, Bureau of Meteorology, CSIRO and Geoscience Australia, Australia.

3 Andrew J. Boulton A,D, Graham D. Fenwick B, Peter J. Hancock A and Mark S. Harvey C ,2008 'Biodiversity, functional roles and ecosystem services of groundwater invertebrates', Invertebrate Systematics, 2008, 22, 103–116

systems contain a number of substances that companies are not authorised for adding to groundwater, eg Biocides

As an example, the Well Completion Report (WCR) drilling log file for Tanumbirini 1[4] showed approximately **21 million litres** of these fluids were lost in the first 400 metres of the drilling process. It is completely unacceptable to allow these chemicals into aquifers where stygofauna live and people draw drinking water.

The evidence from Table 6, Waste management, from Appendix 6 page 15 of the Imperial EMP shows clearly that the drilling fluids being used will contain biocides and these drilling fluids will be treated with drilling chemicals to increase use and avoid bacteria. The same biocide is indicated in SANTOS documents and the contractors are using the same product across the basin and Sweetpea has copied much of this "industry" information in their proposal even though they have no specific details about which contractors and chemicals will be used.

The EMP in Table 9 page 12 of the AECOM clearly shows Glutaraldehyde as an element of the drilling fluid. Glutaraldehyde[5] is a biocide and must not be allowed into the groundwater systems.

The regulator needs to ensure that there are no biocides in the drilling fluid. This is not going to happen by just mentioning it in documentation. Until such a mechanism is in place the EMP must be denied or until scientific assessment on risks to Stygofauna has been completed.

Biocides are very toxic chemicals to aquatic organisms. Stygofauna are known to extremely sensitive to chemicals. Biocides carry warnings such as: extremely toxic to aquatic organisms, has long lasting impacts[6.] They must not be allowed to escape into ecosystems containing the newly discovered and as yet largely undescribed stygofauna. There is clear evidence of these chemicals are in drilling mud.[7]

The injection of these chemicals into groundwater is not permitted under the Petroleum Regulations ii. chemicals or other substances that could leave a residual toxic effect in the aquifer must not be added to the drilling fluid[8].

There is no specific testing data available to show just how toxic these chemicals would be to stygofauna, which is part of the reason the precautionary principle must be invoked to stop this process of injecting these chemicals into the underground water systems. Stygofauna are known to be very sensitive to chemicals and disturbance. It is probable that these chemicals will cause changes in the stygofauna assemblages and disrupt their ecosystem service function. Lethal Concentration studies must be done to clarify risks to stygofauna.

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[4] https://geoscience.nt.gov.au/gemis/ntgsjspui/handle/1/83784

[5] Concerned Health Professionals of New York, & Physicians for Social Responsibility. (2020, December). Compendium of scientific, medical, and media findings demonstrating risks and harms of fracking (unconventional gas and oil extraction) (7th ed.). http://concernedhealthny.org/compendium/ Page 292

[6] *Environ. Sci. Technol.* 2015, 49, 1, 16–32 Publication Date:November 26, 2014 https://doi.org/10.1021/es503724k

[7] Environment Management Plan , Imperial Oil & Gas 2021-2025 EP187 Work Program NT Exploration Permit (EP) 187, www.haveyoursay.nt.gov.au

[8] NT petroleum Code of Practice Page 48.

These underground systems are “nutrient deprived” but the sudden injection of pollutants such as the drilling mud lost during the Tanumbirini 1 well drilling, will introduce levels of carbon and related food sources for bacteria into these systems with a likelihood of significant impacts.

We have enormous concern that recently available data shows that there are very concerning changes in the water systems in the Beetaloo area that need to be explained and fracking exploration must stop until this is done. Specifically increases in salinity suggested by the raw data in RN040936 data logs and the methane in monitoring the same bores needs to be investigated.[9]

The issues relating to possible salinity leaks, as shown by the data from the sensor in RN040936 in August 2019, and the related discussions about the possible causes shows that there needs to be a return to recommendation 7.11 and associated recommendations and the full vertical profile of the monitoring well needs to be covered with multiple sensors. The regulators response to date has been completely inadequate to explain the salinity spike shown in the raw data and the type of sensors used needs to be revisited. As a minimum there needs to be three self-cleaning sensors in each monitoring bore.

The regulator also needs to do a thorough investigation of the issue relating to RN040936 as sensors of the type used SANTOS, Aqua Troll 200’s , have been questioned, although there is no evidence we have seen to support this position and technical advice suggests the fouling excuse is not viable.

Two key points need to be made here.
1 Sensors using an electrical current to measure micro siemens as a salinity or dissolved Ions measurement typically show reduced readings when they suffer from fouling not sudden increases[10].
2 Even when they are suffering from fouling the sensor still show the up and down movement in readings as can be seen from the image below where the red line, the fouling sensor plot is still showing the peaks and troughs as are the green and blue plots form the self-cleaning sensors.

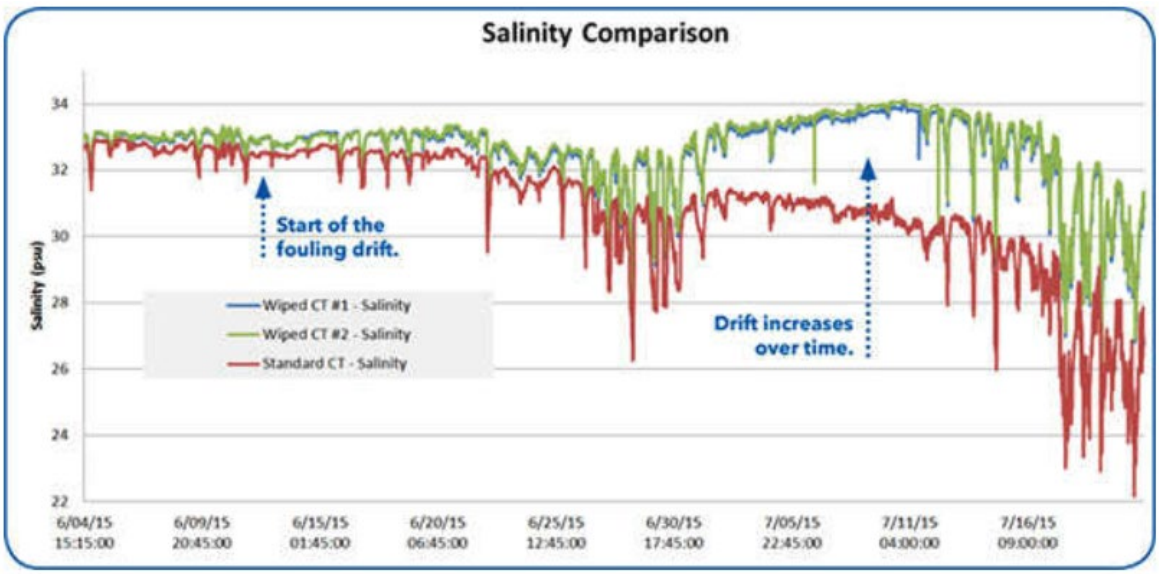
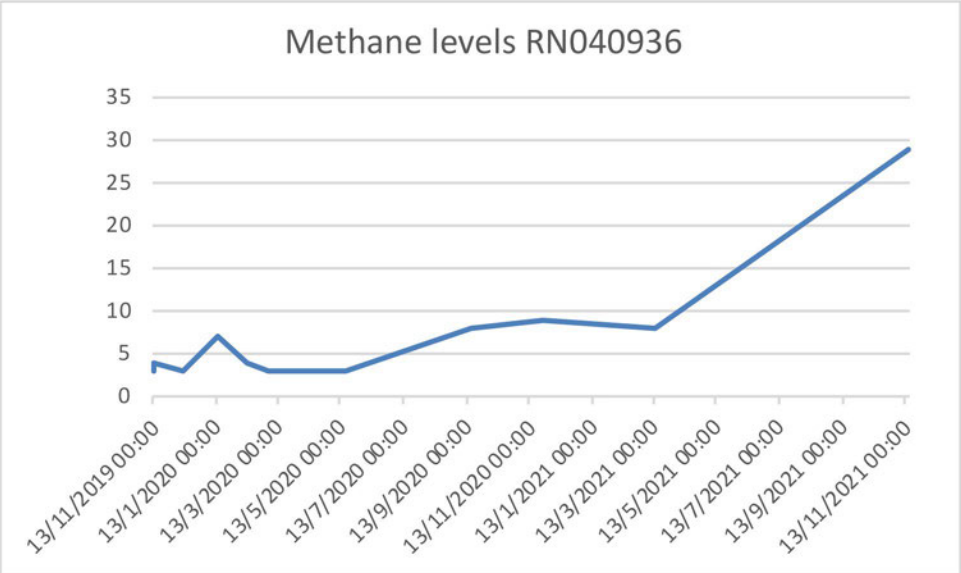


Figure 1: Salinity data from conductivity sensor in long-term case study

[9] Santos-groundwater-monitoring results
[10] https://www.ysi.com/ysi-blog/water-blogged-blog/2019/01/7-tips-to-fight-fouling-and-extend-water-quality-sonde-deployments

The regulator needs to develop an awareness from the sensors and other testing as to the dynamics of water within the groundwater and the bore columns of the monitoring bores. This is vitally important in understanding the data from the monitoring regime designed to give the best possible protection to groundwater.

Figure 1 - Plot of Methane levels in groundwater from RN040936 Impact monitoring bore.



As an example, leakage of methane into aquifers can lead to food webs being disrupted, resulting in a significant negative impact on water quality through an increase in microbacterial blooms, triggered by the methane. These changes can lead to water being unfit for human consumption and de-oxygenation of water.

Normally,

> *The limited supply of carbon reaching groundwater restricts the productivity of the ecosystem considerably, and constrains pristine aquifers to generally being low-energy environments, with, low biomass and low abundance of microbial and invertebrate fauna. Consequently, stygofauna live in environments with limited food supply.*[11]

There is a strong likelihood that the pollutants being leaked into the groundwater by drilling operations is behind these increases in methane.

There is no specific testing data to show just how toxic these chemicals would be to stygofauna, which is part of the reason the precautionary principle must be invoked to stop this process. Stygofauna are known to be very sensitive to chemicals and disturbance. It is probable that these chemicals will cause changes in the stygofauna assemblages and disrupt their ecosystem service function.

Origin ignored these Beetaloo-specific findings in its EMP, instead relying on high level and generic indicators from a 2015 summary paper on stygofauna across Australia to conclude that stygofauna

[11] Stygofauna in Australian Groundwater Systems: Extent of Knowledge P 3.

are unlikely to be affected by its proposed activities.[12] Sweetpea has also not addressed these issues in this EMP, in fact they have relied on very flawed information from other EMP's referencing Imperial and ORIGIN.(Page 91). This is clearly inadequate and tries to downplay the facts from the SREBA studies that theses stygofauna are present and in significant numbers. These risks must clearly be investigated by the regulator and a request for the EPA to formally investigate these risks to Stygofauna and GDE posed by the biocide leaks during drilling and methane leaks is required.

The EMP does not adequately identify or address risks to stygofauna and the ecosystem services they provide posed by the proposed activities, nor does it support the Minister to make a decision in accordance with the principle of evidence-based decision-making under section 20 of the Environment Protection Act 2019. This principle applies to the Minister's decision to approve an EMP, and dictates that decisions should be 'based on the best available evidence in the circumstances that is relevant and reliable'.

The Environmental Protection Authority must do an urgent review of the situation and do a full Environmental Impact Assessment relating to the chemicals being leaked into the groundwater and their implications.

Climate change impacts

Sweetpea's response in relation to the climate change impacts of its project is merely rhetoric unfounded by evidence or analysis. Sweetpea does refer to the IEA 'Net Zero' scenario, but fails to mention that no new gas fields are developed in this scenario - including the Beetaloo. This response is nothing more than opinion put forward as fact. In its current form and without a GGAP, the EMP remains inadequate to address or mitigate the damage to the climate caused by the project.

Corrosion Risks

The preliminary water study (Rees et al[5]) confirmed that sulphate-reducing bacteria (SRB) are present in the basin and colonising casings in water bores. The risks that these bacteria pose to the integrity of wells have very significant implications for the future and this needs to be factored into decision making. It is the clear responsibility of the NT government to regulate these risks. The stated policy that decisions in relation to petroleum and gas development will be guided by the principles of Ecologically Sustainable development (ESD) make it vitally important that the longer term view is taken with regards to this matter and fracking proposals in the NT.

It is possible that the fracking companies will be gone from the region and the responsibility for managing the outcomes of this corrosion, if that is even possible, will fall on future NT governments and the consequences will be suffered by future generations of Territorians. The evidence from the Marcellus shale in the US shows that the problems with leaks keep growing with time and massive remediation costs are thrown back onto governments and communities. This clearly needs to be a part of the final risk assessment mentioned in the Pepper Inquiry's recommendation 4.6.

There is a massive risk of future problems created by well failures. These problems seem to be unavoidable if the wells are proceeded with. This is a clear breach of ESD principles as it creates significant problems for future generations. Sulfate-reducing bacteria and sulphur-oxidizing bacteria (SOB) are in the Beetaloo[6] and are a clear risk to the long term viability of wells. These bacteria

[12] Origin 2022 EMP, 165.

instigate corrosion processes that impact on concrete and steel structures. Microbially induced concrete corrosion (MICC) caused by sulphuric acid attack is a major problem with concrete [13].

The Oil and Gas Industry can only control sulfate reducing bacteria (SRB) with biocides when it is on the inside of a well. The environment where SRB are present (mainly damp soil with organic material present or other bacteria which can provide a food source/or aquifers) is a natural control system until punctured by an oil and gas well. This gas or oil well, if cement coated, gives the SRB food and their numbers grow as the natural control (availability of food) is no longer constrained. As SRB "eat" the sulphates in the cement they exhaust Hydrogen Sulphate (rotten egg gas), which in the presence of water turns to acid, initiating the whole cycle starts again. How long a well's external surface will withstand the corrosive effects of this acid before it is broken down enough to allow cross contamination of the aquifers, depends greatly upon the number of bacteria present, but we can be absolutely confident that this cross contamination will eventually occur

[5] Gavin Rees, Stefanie Oberprieler, Daryl Nielsen, Garth Watson, Michael Shackleton and Jenny Davis, (2020) Characterisation of the stygofauna and microbial assemblages of the Beetaloo Subbasin, Northern Territory. GISERA project number: W18. December 2020
Reports show that corrosion is already a problem in QLD coal seam gas projects[14][7]. Saltel Industries was approached in 2016 by one of Australia's leading natural gas producers to tailor a solution for their unusual problem: in some of their CSG wells in Queensland, the 7- inch production casing must cope with severe and localised external corrosion developing at shallow depth. These corrosion cases are suspected to be caused by bacteria growing under specific pressure and temperature environments. Microbiologically-influenced corrosion seems to be systemic in the region, and other operators might encounter similar issues in their CSG wells. There needs to be further study of this issue in the SREBA before these wells are allowed to proceed[8].

This information confirms that corrosion is an issue in the CSG areas of QLD and validates fears that the same process will cause wells to eventually fail in the NT, releasing injected chemicals and related material, back into the fractured rock layers, where they may mix with the hypersaline waters of the Moroak Aquifer before finding their way into surface waterways.

This EMP places the Roper River at risk from surface water and underground water problems and there needs to be a proper risk assessment done in light of the SREBA research. The problem of well casing corrosion is extensive in the USA[9]. A root cause analysis of the 2015 Aliso Canyon blowout determined that surface corrosion on the outside of well casing caused by prolonged contact with groundwater and microbes, most likely methanogenic Archaea, was the underlying cause of the corrosion. There are many examples of corrosion problems affecting infrastructure in the NT.

In 1998 the Adelaide River Bridge partially collapsed due to the impact of corrosive bacteria[15][10]. The effect of corrosive water on cementing and casing in the NT is demonstrated by deep oil exploration wells (McDills and Dakota) drilled in the Perdika/Great Artesian Basin in the 1960s (the Perdika Basin is one of the prospective unconventional shale gas areas of the NT). Now, some fifty years later, the steel casing has almost entirely corroded away, resulting in inter-aquifer contamination. These wells required expensive rehabilitation work to stem artesian flow. A single bore cost the Territory and Commonwealth Governments $500,000 to plug (1960s prices), as the company responsible for the

[13] Hisashi Satoh , Mitsunori Odagiri, Tsukasa Ito, Satoshi Okabe, 2009, Microbial community structures and in situ sulfate-reducing and sulfur-oxidizing activities in biofilms developed on mortar specimens in a corroded sewer system, Water Resources 43(18):4729-39
[14] https://www.einpresswire.com/article/480473562/xpandable-patches-to-extend-the-life-of-corrodedcsg- wells-in-queensland-australia
[15] NT News August 27th 1998

well was insolvent. This example highlights the issue of operator insolvency due to the boom and bust cycles of oil and gas development which complicates efforts to hold liable parties responsible and provide for timely remediation.

The hypersaline nature of the deep aquifers and the high temperature further raises concerns about the integrity of the wells with both deep corrosion risks and closer to surface risks. There is a major concern among our stakeholders that integrity failure will connect the hypersaline deep aquifers like the Moroak to beneficial fresh water systems like the Gum Ridge aquifer. This poses a massive risk to the human and animal use of the region in the medium and long term and is clearly a breach of ESD principle of intergenerational equity.

The future risks imposed on Territorians and other economic sectors are completely inappropriate and are a clear breach of the EPBC act provisions relating to ESD and the precautionary principle. The Samuels repor[16]t [11] clearly articulates the failures of jurisdictions such as the NT to enforce the EPBC act and its embedded principles. The NT Government espouses the ESD principles as the guiding principles in its decision making in relation to the processes around fracking yet it does not appear to be implementing these principles. The principles must be applied to the review of this EMP.

Chemical Use

Sweetpea's EMP must be rejected because its chemical use information is clearly inadequate, and shows the associated risks have not been properly considered.

Firstly, Sweetpea's submission does not even provide an analysis of the chemicals to be used by the project as stated on just a generic review of some. This is woefully inadequate and the EMP needs to be updated with a real analysis. This is a clear case of a small player cutting corners to suit their timeframes and not doing the process properly.

Chemical substances used in fracking are of extreme concern to people across the region and they should not be allowed to be injected into the ground where at some point they may leak into the underground water systems and eventually into major rivers in the NT. Given the corrosive bacteria issues and the statistics on well failures, especially long term, their use is unacceptable. The NT government has a major responsibility to regulate these chemicals and to protect the people and the environment in the NT from them.

Chemicals in fracking processes have been related to a range of environmental and health concerns and the EMP seems to gloss over these issues and what appears to be relevant information.
A lot of this information has emerged in the USA since the Pepper inquiry as the US becomes aware of and has to deal with groundwater pollution and leaking wells on a massive scale. Also it has emerged that per- and polyfluoroalkyl substances (PFAS) chemicals or their derivatives [17] are being used in fracking and it appears some of the substances listed by Origin are in these categories. PFAS and related chemicals, known as forever chemicals, have very significant health implications and

[16] Samuel, G 2020, Independent Review of the EPBC Act—Interim Report, Department of Agriculture, Water and the Environment, Canberra.
[9] Concerned Health Professionals of New York, & Physicians for Social Responsibility. (2020, December). Compendium of scientific, medical, and media findings demonstrating risks and harms of fracking (unconventional gas and oil extraction) (7th ed.). http://concernedhealthny.org/compendium/
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[17] Horwitt, J.D, July 2021, Fracking with "ForeverChemicals" Physicians for Social Responsibility

have already caused significant community concern in the region and they should not be allowed. The risks are too extreme

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As an example, Polyethelene glycol is noted in the PSR fracking with PFAS document as one of the chemicals of concern. Michigan in the USA has a drinking water standard of 6 parts per trillion for such chemicals. One cup is enough to pollute 22 billion litres of water or 12000 Olympic swimming pools. The Imperial EMP suggests this chemical is to be used.

We ask that these chemicals be banned from use in the NT fracking industry.

The EMP does not show sufficient concern about chemicals like Dioxane. Dioxane is listed in the 7th Compendium of Scientific, Medical, and Media Findings Demonstrating Risks and Harms of Fracking as a carcinogen[18]:

> Most notable is the constituent 1,4-dioxane, a previously discovered PW component that is associated with human cancer and has been shown to be challenging to remove from the waste-stream.

It is also an acute category 3 hazard to the aquatic environment.
Given the Stygofauna presence and the long term risks of leaks it is completely unacceptable to be adding these chemicals to the underground systems that people and biodiversity and livestock depend on and that could in the long term impact on rivers and the associated aquatic biodiversity.

Ethylene Glycol is a cfracking hemical known to the State of California to cause birth defects or other reproductive harm. In animal studies it is consistently associated with adverse effects on the kidney such as crystal nephropathy.

Ulexite is known to be toxic to reproduction and may impair fertility and cause harm to the unborn child. These chemicals are dismissed as low concern yet there would appear to be much more risk than indicated, especially given the aquifers are sources of drinking water and agricultural water. Biocides, such as Be-9 are a major risk to aquatic species, but there is no concern shown in the chemical analysis. The material is very toxic, and has classifications R51/53 Toxic to aquatic organisms, may cause long term adverse effects in the aquatic environment. This cannot be allowed until a full analysis of risks to Stygofauna is provided. There are many chemicals with high aquatic toxicity which means they have significant implications for stygofauna and the water systems from the Beetaloo through to the Katherine, Flora, Daly and Roper rivers. There has been no research done on the possible impacts of these biocides on stygofauna or the groundwater environment of the Cambrian Limestone Aquifer. No further approvals should be made until this work is completed to enable an informed risk assessment.

It is vitally important that the NTG does its checking regarding these chemicals as the impacts on water, human and animal health are of great significance. If these chemicals turn up in agriculture or horticulture water supplies, they could greatly disrupt these industries.
There are many chemicals listed which carry significant warnings and are not analysed in a manner providing any confidence that they will not be a problem. The Marcellus shale area in the US has massive problems with chemicals in water and the 7th Compendium (2020)[19] and the Pennsylvania state Grand Jury give some insight into these problems. Chemicals like endocrine disruptors,

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[18] Lester, Y., Ferrer, I., Thurman, E. M., Sitterley, K. A., Korak, J. A., Aiken, G., & Linden, K. G. (2015). Characterization of hydraulic fracturing flowback water in Colorado: Implications for water treatment. Science of the Total Environment, 512-513, 637-644. doi: 10.1016/j.scitotenv.2015.01.043

surfactants and biocides are major risks and need much more detailed and careful analysis. It is the responsibility of the NT government to make sure this analysis is done thoroughly to identify and prevent human health risks and environmental risks.

The NTG must provide strong regulation on this issue as there are very significant implications and long term risks to the water systems that underpin human occupation and businesses across the region as well as environmental risk. The analysis is also severely flawed in that it does not detail the chemicals to be actually used and makes statements like "commonly found in food and household domestic products". This is industry propaganda and marketing spin and has no place in a technical EMP type document. This is also irrelevant, even if it was true. Many household chemicals are poisons or have severe environmental impacts if misused. Chemicals in fracking processes have been related to a range of environmental and health concerns and the EMP seems to gloss over these issues and what appears to be relevant information.

As an example, the EMP does not show concern about 1-4 Dioxane. 1-4 Dioxane is listed in the 7th Compendium of Scientific, Medical, and Media Findings Demonstrating Risks and Harms of Fracking as a carcinogen[20] [12]:

Biodiversity Risks

The Protect Country Alliance has strong concerns regarding plans to store wastewater fluid and toxic chemical flowback fluid in open air waste ponds. This practice directly contradicts recommendation 7.12 of the Pepper Inquiry and presents significant risks to biodiversity in the region.

First and foremost, the area concerned can only be described as data deficient in relation to biodiversity and environmental information and these inadequacies in knowledge fundamentally challenge the conclusions in the EMP. Simply conducting a desktop audit of biodiversity within the area and then assuming that there are no concerns does not reflect the data deficient basis of the systems used. This lack of information about the region's biodiversity holds for both land and water ecosystems throughout the region and was highlighted in the Pepper Inquiry.

It is vitally important that work be done to provide guidance around these many issues. In situations where knowledge is uncertain **the Precautionary Principle underlying our environmental legislation requires a very cautious approach.**

If companies are wishing to exploit non-renewable resources in the area, they have a responsibility to do the work required to ensure that environmental risks are 'acceptable'. Decisions based on such limited and flawed data are unacceptable and a range of on-ground work needs to be undertaken to improve the knowledge base upon which to evaluate decisions.

Open air wastewater tanks pose unacceptable risks to biodiversity

Open water storages should be not allowed in line with recommendation 7.12 of the Pepper Inquiry. To allow these pits to be constructed will lead to dramatic and unacceptable changes in biodiversity and create enormous risks that would not be present if enclosed tanks were used.

[20] 13 Concerned Health Professionals of New York, & Physicians for Social Responsibility. (2020, December). Compendium of scientific, medical, and media findings demonstrating risks and harms of fracking (unconventional gas and oil extraction) (7th ed.). http://concernedhealthny.org/compendium/

The work done on the birdlife assessment is inadequate. **Data deficient systems cannot be relied upon for desktop surveys.** This is especially the case where endangered species are concerned, as they are in low numbers anyway. Gouldian finches, grey falcons and crested shrike tits have all been reported in the region in recent times by bird watching groups. It is simply not good enough to rely on desktop and related techniques when dealing with an area where the Pepper Inquiry specifically said more research needed to be done to inform decision making.

Open storage tanks and evaporation pits almost guarantee that these issues will manifest and action like appropriate screening must be an absolute minimum response.

The evaporation process means concentrations of chemicals and other pollutants will be increased in the open air ponds. It is impossible to prevent birds from accessing these toxic open air ponds. We do not want to discover that bird species are in the area when their dead bodies are found in an evaporation pond.

Anecdotal evidence from ongoing discussions with land holders and traditional owners in the proposed drilling area highlights the impact that a record breaking hot and dry season has had on local water and wildlife. Birds and other wildlife are relying on limited water. If activities were to introduce bodies of open water in the area through open storage ponds, these would undoubtedly receive significant visitation from thirsty wildlife. This could poison wildlife and spread contamination.

Birds, especially honeyeaters and other species, dip bathe and drink on the wing. They would also be able to land on the slope of the liner covered banks. There are too many risks associated with the design of the pond systems to be acceptable. If this practice is to be allowed netting must be used to exclude birds.

Figure 1 Dip bathing Honeyeater

Most bird taxa have a gland at the base of the tail, the uropygial or preen gland. The oil it produces keeps the feathers flexible and assists the interlocking barbules to stay intact, thus forming a barrier that helps repel water and insulate the bird. In the case of waterbirds, preening oil helps them stay afloat, and without it birds may even drown.

Chemicals like surfactants can alter the efficacy of waterproofing elements in their feathers, rendering them flightless and vulnerable to predation. Birds may also die because surfactants reduce the ability of feathers to act as insulation in cold weather, and have been used in the USA to control populations of pest species (Lustick, 1976).Clearly the open water systems need to be effectively netted with small enough mesh to exclude small honeyeaters and finches as well as species like friarbirds.

Claim such as surfactants are "no more toxic than common household substances" as on page 33, and are "commonly found in everyday products, from toothpaste to laxatives to detergent to ice cream" are a simplistic attempt to downplay significant risks that exist and are increasingly coming into research evidence. However, surfactants can be deadly for birds and frogs. This complete lack of concern for biodiversity is unacceptable especially given the biodiversity crisis highlighted by the Paris Accord of 2019.

Amphibians

The fencing around freshwater storages and all other water needs to be frog proof, and not just have wildlife ladders installed. Native burrowing frogs are likely to try to access standing water. This highlights one of the risks relating to holding polluted water in open evaporation ponds in that it is likely to attract native species who cannot detect the pollutants. This includes elements like surfactants which are not a human health issue but a massive issue for many non-human species, especially amphibians.

Low walled water storage areas, even if pumped dry, will have residues, and when rains come they will attract frog species.

There are many unknowns about this region's biodiversity. This is especially the case with endemic frogs. There is a need to determine the range of the water-holding frog Litoria platycephala and to determine whether the species in the McArthur/ Beetaloo area is in fact a different species.

Plastic lined pits can be death traps for many species of native frogs that do not have toe pads. Plastic pits have been used as traps for some frog species. The risk includes many of the burrowing frog fauna in the Beetaloo region. These species are likely to move to standing water bodies to breed. The pits should not be allowed, but if they are they need to be carefully designed. This elevated risk includes the period over the wet season where the pits may be emptied to avoid them overflowing. They will still collect water and become frog breeding sites, especially for burrowing frogs. Any residues remaining will cause problems. Surfactants are highly toxic to native frog tadpoles at very low concentrations.

The cane toad Rhinella marina is a major threat to a number of animal species, with population level declines documented (Doody 2004, 2006, 2009)[21]. Allowing open water storage pits will dramatically increase cane toad numbers in the region with broad biodiversity implications.

Doody (2009) concludes, " We observed population-level declines in Australian predatory lizards caused by the arrival of an invasive species, Bufo marinus, at two sites along the Daly River. In

[21] JS Doody, B Green, R Sims, D Rhind, P West, D Steer (2006). Indirect impacts of invasive cane toads (Bufo marinus) on nest predation in pig-nosed turtles (Carettochelys insculpta). Wildlife Research. J. S. Doody B. Green D. Rhind C. M. Castellano R. Sims T. Robinson (2009). Population-level declines in Australian predators caused by an invasive species. *Animal Conservation* Volume12, Issue 1.

contrast, there were no significant declines in populations of Crocodylus johnstoni. Amphibolurus gilberti populations increased substantially, presumably due to the losses in Varanus panoptes, a known predator of this species. These findings indicate that the invasion of B. marinus into this ecosystem caused a structural change in the lizard community. Changes in the abundance and community structure of these top predators may alter species interactions, in particular patterns of predation and competition, and the energy dynamics of the ecosystem. Recovery from low numbers, and possibly local extinction, may depend on the control of Bufo marinus, and/or the recolonization from individuals from the surrounding landscape"[22].

Further personal communication with the author indicates follow up surveys showed some species, like Varanus panoptes and Varanus mitchelli, are no longer present at the survey sites. Follow up work in the Kimberleys reinforced the initial findings from the NT and indicated a broader range of varanid species were impacted.

Many areas of the NT were originally thought to be too dry for cane toads to colonise but this has been shown to be incorrect. The main reason toads have been able to colonise large areas of semi-arid and arid NT is because of the use of open water storage in the cattle industry. The creation of such spaces for water and wastewater storage will enable cane toads to seek refuge and breed in the area. The local cane toad population would be massively increased if open water pits were introduced.

This is particularly destructive of varanid populations and other reptile species. Introducing standing water bodies into an area will not only cause the cane toad population to increase, but will result in cane toads breeding at the sites. This introduces a size class of cane toads into the area that would not be occurring without the water pits, which in turn causes dramatic declines and even local extinctions of smaller Varanid species and the juvenile stages of the larger Varanid species such as V.panoptes, V.gouldii and V.mertensii.

Species that will be impacted negatively are likely to include:

Varanus acanthurus	Ridge-tailed Monitor
Varanus baritji	Black-spotted Ridge-tailed Monitor
Varanus mertensi	Merten's Water Monitor
Varanus mitchelli	Mitchell's Water Monitor
Varanus scalaris	Spotted Tree Monitor
Varanus tristis	Black-tailed Monitor
Tiliqua scincoides	Common Blue-Tongued Lizard or potentially Centralian Bluetongue.

[22] J. S. Doody B. Green D. Rhind C. M. Castellano R. Sims T. Robinson (2009). Population-level declines in Australian predators caused by an invasive species. *Animal Conservation* Volume12, Issue 1.

Varanus panoptes	Yellow Spotted Monitor
Varanus gouldii	Sand Monitor

There is also research indicating impacts on smaller lizard species due to large toad populations. In a two-year study in the Roper River region of the Northern Territory, Catling et al. (1999)[23] found that high cane toad densities were associated with a significant reduction in the abundance of small lizards, possibly caused by reducing their invertebrate food supply. Like so many of these aspects of the local environment, there is a deficiency of data that should be addressed before any such changes are created in the local environment.

There are additional issues with the use of chemicals, and this puts the wastewater elements of this plan in a particularly high risk category. Surfactants and many other chemicals are especially toxic for frogs and have implications for other species such as birds. Even if the pits are emptied, there will be residues from waste water present which will most certainly impact wildlife.

Waste disposal

The issues around waste disposal are not made clear and require clarification. The use of evaporation tanks mean that the concentrations of chemicals and levels of radioactivity and other factors will be increased. The ways these issues will be scaled with the development of multiple wells greatly increases the risk and needs to be studied in an EIS.

Social licence

There are clearly issues where the people involved on the ground do not believe that Sweetpea have done the consultation that they claim to and have taken a very aggressive attitude to force access to areas and put people further offside. It is important that the regulator follows up on these consultation issues to be certain that the consultation claimed is real and appropriate, otherwise the risk of embarrassment such as from the SANTOS V Rallen case will be repeated. SANTOS claimed to have done all the required consultation in its EMP, which was approved, yet the court found this was not the case.

The indigenous groups across the region keep repeating that they do not want fracking on their land and are concerned about the risks to water and their sacred sites[24]. At a meeting in Darwin of some 45 traditional owners from the region, Jun 12-13 2021, re-stated their opposition to fracking on their lands and resolved to fight it. We also have communication with pastoralists in the region who have resolved to take action to prevent fracking on their properties. We do not believe Sweetpea has done the correct thing here and would refer you to submissions from the Rallen pastoral group and the Nurrdalinji traditional owners group from the area, both who have communicated to us that inadequate consultation has occurred and they have significant concerns.

[23] Catling, P.C., Hertog, A., Burt, R.J., Wombey, J.C., and Forrester, R.I. (1999). The short-term effect of cane toads (*Bufo marinus*) on native fauna in the Gulf Country of the Northern Territory. *Wildlife Research* **26**:161-185.

[24] https://www.abc.net.au/radio/adelaide/programs/worldtoday/traditional-owners-fear-gas-fracking-threat-to-traditional-sites/13344778

Figure 2- Traditional owners and Pastoralists protesting Sweetpea's behaviour may 2022

Aboriginal people are expressing serious concerns:

There is a lot of concern amongst Indigenous representatives across the region about the potential impacts of fracking on their culture and the local environment. Inadequate consultation with Aboriginal people from the region impacted is one core aspect of this breach of faith[25]. Many people express that they do not feel there has been a genuine informed discussion with them in relation to these matters. Aboriginal people in the area are indicating they do not believe they signed any consent for this exploration and there is a likelihood this will progress to court proceedings if the traditional owners are not properly consulted and respected.

Legal action against Glencore over the McArthur River Mine's issues is a relevant recent example. Much of the interference with water systems is seen as impacting on sacred sites and the related ability to enjoy the land. The mining corporation's evident disregard for indigenous views echoes the way of doing business and approaches to consultation that led to the Juukan Gorge catastrophe in WA. The area of Newcastle creek where Sweetpea is wanting to operate has many important indigenous areas that are still being fully documented. There needs to be a formal check with the traditional owners and Aboriginal Areas Protection Authority AAPA.

The EMP should not be approved until these issues are resolved.

The Pepper Inquiry heard that efforts to regulate fracking tend not to take into account the integrated nature of ecosystems and thereby conflict with Aboriginal people's responsibilities for Country, breach ESD principles, and pose risks to the physical and mental health of impacted communities. A clear example of this is the way that no-go zones and related exclusion principles do not take into account the catchment and feeder areas of springs and other groundwater dependent ecosystems, ignoring the integrated nature of the local environment and again breaching ESD principles.

[25] https://www.thesaturdaypaper.com.au/news/politics/2020/12/19/fracking-country-the-nt/160829640010913

Aboriginal people have a very sophisticated knowledge of water systems. Throughout consultations during the Fracking Inquiry and beyond, evidence has been put forth that fracking and the risks to water, including the volume, flows and quality posed by the fracking process are unacceptable. Local aboriginal communities frequently voice concerns and distress regarding the risks fracking poses to water and the ecosystems that depend on it. There is no social licence for these activities.

[redacted]

From: Marylou Potts <ml@mlppl.com.au>
Sent: Friday, 17 June 2022 5:35 PM
To: SweetpeaPetroleum DEPWS
Subject: 84.6.: Rallen Objections to Fracking EMP
Attachments: 220617 MLPPL ltr to Minister - re DFT EMP objection.pdf; 211203 Andrew Perkins Report re Rallen and Sweetpea Petroleum 211203.pdf; 211022 Draft FINAL Tanumbirini Report.pdf; 220615 Rallen Objections to Fracking EMP.pdf

Dear Minister,

Please find attached Rallen Australia Pty Ltd's objections to the draft drilling fracture stimulation and testing EMP of Sweetpea.

Yours sincerely,
Marylou Potts

Director & Principal Solicitor
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15 June 2022

Rallen Objections to Well Drilling, Hydraulic Fracture Stimulation and Well Testing EMP

Page numbers of EMP highlighted in yellow. Black is point being raised from within EMP. Blue is Rallen's comment on the EMP.

Pg vi (h) (i) (k) (m)

1. Undertake multi-stage hydraulic fracture stimulation operations and commence testing operations at "Well 1, Well 2, Well 3, Well 4.

There needs to be a specified number of stages in the EMP, environmental impact and water usage cannot be managed if there is no fixed number.

Sweetpea have indicated on their website "Tanumbirini 2H and 3H 10 to 11 frac stages LEVEL 2, Maverick 1H well 30 frac stages LEVEL 5, proposed EP136 development wells 100 frac stages LEVEL 5.

Pg ix

2. Mobilisation in the above **assumes access via either the Western Access Track (WAT) or Eastern Access Track (EAT)** as per the C&WB EMP. Both EAT and WAT provide for dry-season access with no further works that aren't sanctioned under a granted Sacred Site Clearance Certificate (SSCC). However, wet weather use of the EAT **is assumed to require a new Sacred Site Clearance Certificate,** this will not be needed in 2022 as Well 1 is located on north of Newcastle Creek and accessed via the first section of the WAT only be necessary if the WAT is not available due to delays with land access negotiations. If neither a new SSCC nor access to the WAT is available by Q4 2022in 2023 and beyond then Sweetpea may have to stack equipment south of Newcastle Creek or move all equipment north of Newcastle Creek prior to the 2022-2023 wet weather season and alter the drilling operational priority. This approach mitigates the risk of not being able to do works, other than transit, of the Newcastle Creek crossing within RWA2restricted work areas.

No access via Western access Track or Eastern Access Track have been achieved, Sweetpea has constructed new access track, with no way of crossing the Newcastle Creek without breaching AAPA certificate. AAPA certificate states no crossing and no work allowed in the Restricted Work Area RWA-2 "being the entire length of the Newcastle Creek"

Pg x

3. AC2020/072 allows all drilling, **hydraulic fracture stimulation** and well testing activity proposed under this EMP. AAPA have raised, formally, a more recent desire to undertake further consultation regarding water extraction from water bores covered under AC2020/072, however, although we support AAPA's ongoing consultation we would say it is not required for approval of this EMP as:

Clarification of the conditions of Authority Certificate C2020/072

We note your concerns about the application of Authority Certificate C2020/072 to the extraction of water, and particularly the distinction between water extraction from existing bores for camp purposes and the establishment of new bores for the purpose of hydraulic fracturing.

We confirm your interpretation that the certificate only applies to water extraction from existing bores. AC2020/072 does not give Sweetpea the authority to extract water for hydraulic fracturing, they have to obtain an AA 9 certificate.

Pg xii

4. The DST EMP also considers the annual onset of the wet season and have developed a wet weather contingency plan to minimise the regulated activities impact on the environment. Further details of wet weather contingencies have been considered in Section 7.3 and Appendix B. It should be noted that the above assessments are not intended to be assessments of impacts on pastoral business; whereas there are established protocols to assess environmental impacts and risks, **assessing the impacts to a pastoral business is much more difficult and requires in depth understanding of that business.** In this EMP measures to protect the environment are clearly articulated, however, specific measures to minimise impacts on pastoral business will require ongoing and future engagement with the pastoralist to understand their business activities at the time of proposed exploration activities. Sweetpea is committed to continuing to attempt such constructive engagement.

That statement is incorrect, Rallen has engaged an independent expert and have evidence that there will be a $3.5 mil impact on the business over the first 3 years of Sweetpea's activities.

Pg 5

5. Continued access to all approved gravel pits for resource extraction.

Rallen have not given Sweetpea permission to extract gravel from its property.

Pg 8

6. One limitation of AC2020/072 is that it allows for '**transit only' across the existing pastoral lease track** at its intersection with Newcastle Creek in Restricted Work Area 2 (RWA2) - we say limitation in this instance as there is an existing pastoral track across the creek in this location and we would propose only to maintain this crossing and minimise the risk of any damage to the creek bed or banks through erosion or other impacts. **Given the works would be within the existing 'easement' created by the pastoral track we see no possibility** of impacts to sacred sites (and no sacred sites are noted at the crossing). We are simply seeking approval to do routine maintenance and/or minor upgrades to improve the standard of the track and protect the existing environment.

Pg 8

7. **Sweetpea have been engaged with AAPA throughout 2021 to seek authority to undertake these minor works at this crossing** to ensure it is suitable for use during wet weather, however, due to COVID19 and other operational delays the custodian consultation will now occur in early 2022. Sweetpea's contingency plan to the 'transit only' limitation is two-fold as discussed in the Proposed Schedule section above. Sweetpea are committed to meeting the conditions specified in the AAPA certificate to ensure risks to sacred sites and the identified Restricted Work Area are managed.

Sweetpea in not using any existing pastoral track, they have cut a new access track. AC2020/072 strictly prohibit any crossing or any work in relation to the Newcastle Creek. Sweetpea have no way of accessing the bottom of EP136 without breaching the AAPA certificate.

Pg 12

8. As part of the AA 9, a new Exploration Agreement is also being drafted to incorporate certain, limited areas outside of EP136 that could be used for 2D seismic acquisition and/or camp locations.
9. Access Authority application is being finalised by DITT for operations associated with access tracks and an accommodation camp located outside the permit area.
10. AA 9 Certificate

Pg 22

• Sweetpea require an Access Authority (AA 9) from the Department of Industry, Tourism and Trade (DITT) to carry on operations in areas outside of EP136.

• Sweetpea are in the final stages of the AA 9 approval which will provide approval to locate an accommodation camp outside of EP136.

• Sweetpea are finalising the required agreements with registered Native Title Parties' body corporate, Northern Land Council and the NT Government, prior to the AA 9 title being granted. It is anticipated that the agreement will be finalised in coming months after completion of the AA 9 consultations with Native Title Parties.

Sweetpea have already conducted regulated activities outside EP136, without obtaining the AA 9 certificate.

Pg 32

11. The two primary access options are as follows:

• Option 1 Eastern Access Track (EAT) – 39.56 km length x 18 m wide (Figure 5); or

• Option 2 Western Access Track (WAT) – 35.45 km length x 18 m wide (Figure 6).

Sweetpea needs to update Figure 5 and 6 as there is a new access track to EP136 and supplied maps not valid.

Pg 55

Drilling cuttings, cement returns and fluids from exploration drilling	**Drilling Fluids** **~1 ML per well** **Cuttings** **~650-850 m^3 per well**	**Disposal:** All drilling fluids will be directed to an onsite mud sump. The liquid contents of the sump will be evaporated and the sump **backfilled**. **No backfilling of sumps allowed on Tanumburini**
Hydraulic fracture stimulation flowback fluids	**Up to ~20ML per well** **<1 ML offsite disposal**	**Storage/Evaporation and Disposal:** Frac flowback fluid evaporation and **eventual disposal**. **Rallen wants clear timeline, dates and accountability of interest holder for disposal**
Well Production Testing	**<1 ML per well (wells are dry gas)** **<1 ML offsite disposal**	**Storage/Evaporation and Disposal:** Production water will be evaporation and eventual disposal. Reuse options may be considered pending technology option risk assessment and ALARP. **Rallen wants clear timeline, dates and accountability of interest holder for disposal**
Drilling completion, suspension and kill fluids	**0.5 to 1 ML per well**	**Storage/Evaporation and Disposal:** Production water will be evaporation and eventual disposal. Reuse options may be considered pending technology option risk assessment and ALARP. **Rallen wants clear timeline, dates and accountability of interest holder for disposal**
Naturally Occurring Radioactive Material (NORMs)	**0 kg reportable**	NORMs above reportable thresholds are not likely to be generated. However, if NORMs occur at levels that exceed reportable thresholds then a separate waste management plan will be developed for handling of NORMs material at an appropriate licensed waste disposal facility. **Rallen wants clear timeline, dates and accountability of interest holder for disposal**

Pg 56

12. Any solids derived from water re-use technology or sediments in the bottom of a tank will be monitored and disposed of properly either **on location** or at licensed and approved disposal sites as set out in the regulations. Testing of solids will be required prior to any off-site disposal, if required, to determine how and what approved licensed disposal facility the solids may need to be transferred to by licensed contractors.

Pg 57

13. An assessment of the environmental impacts and environmental risks posed by the drill cuttings and residual drilling fluids will be carried out before disposal options determined. The disposal options for the drill cuttings and residue from drilling fluids will consider the results of the assessment **to either remain onsite** or required offsite disposal

Pg 57

14. Recycling and re-use of the solid waste from the drill cuttings may be considered if a viable option is identified to minimise the volume of waste that is **disposed of onsite** or transported and managed offsite.

Rallen does not consent to any disposal of any liquid, mud, or evaporated sludge on its property. All waste material must be removed and disposed of off-site.

Pg 65

15. Gravel will likely be required for ongoing maintenance activities, which will be sourced from the existing gravel pits identified in the C&WB EMP.

Rallen has not given Sweetpea permission to extract gravel from its property and does not have a current mineral extraction license

Pg 87

16. Newcastle Creek and several small ephemeral creeks are located within the EP136. Access tracks have been designed **to utilise a main existing station track** which crosses Newcastle Creek twice at two existing crossings. The secondary station track to access Lease Pad 1 and all other tracks to access the lease pads do not cross any major creek or drainage lines (refer Figure 26).

Sweetpea is not using any existing access track to cross Newcastle Creek so Figure 26 needs to be updated and is no longer valid.

Pg 101

17. All the recorded sacred sites identified within the regulated activity area are associated with Newcastle Creek. Sweetpea can conduct activities to avoid the sacred sites and meet the conditions stipulated for Restricted Work Area (RWA) 1 and RWA2 (Newcastle Creek). **The only interaction of Sweetpea activities will be on RWA 2 which is associated with the two existing Newcastle Creek crossings that are required to access the lease pads.**

Sweetpea will not be using any existing Newcastle Creek crossings, how are they planning to gain access to bottom part of EP136?

Pg 102

18. Only **minor maintenance and upgrade of the existing access track will be conducted to cross Newcastle Creek**. Sweetpea will avoid the recorded Aboriginal archaeological sites and will have cultural monitors managers present during the activities. It is anticipated that the works on the creek crossings will make substantial improvements to the existing crossing, minimising risk of erosion and disturbance to the creek bed and bank

AAPA certificate explicitly states "transit only at existing crossing and no work may occur in RWA-2, not even minor maintenance" - that will be in breach of the AAPA certificate.

Pg 134

19. A groundwater extraction licence has already been issued to Sweetpea to obtain a water supply from the Gum Ridge Formation at RN037655 (Water Extraction Licence GRF10346). A summary of the availability of groundwater in the Gum Ridge Formation aquifer was provided in the decision statement prepared by the NT Controller of Water Resources for Licence GRF10346.

    Extraction limited to the volumes required to support drilling and stimulation activities covered under the EMP and the extraction licence (GRF10346).

Groundwater extraction licence is invalid, bore no. RN037655 where Sweetpea intents to draw water from, belongs to Rallen and no approval has been given to Sweetpea to use that bore.

Pg 146

20. AC2020/072 **allows for 'transit only' across RWA2 at Newcastle Creek on the existing pastoral lease track**, which provides one of the two possible mobilisation routes to and from the exploration lease pads. Sweetpea's contingency plan to the 'transit only' limitation for RWA2 in AC2020/072 is considered under the C&WB EMP, which includes provision for two access options, the Western Access Track (WAT) and the Eastern Access Track (EAT). Further consultation with AAPA and the Traditional Custodians is underway for a SSCC.

Sweetpea not using any existing tracks, and neither the (WAT) and (EAT) access tracks will be used, have to update EMP with the correct information.

Pg 148

21. Other than crossing at RWA2**, ramps may be utilised to improve the crossing**, where ramps are used, they will be aligned perpendicular to creek bed or drainage line, as much as possible using local materials. **Any rock protection** must be restricted to what is necessary to provide safe passage and **be placed at bed level**.

AAPA certificate prohibits any work at RWA 2, Sweetpea is not allowed to cross or do any work to RWA 2, this has to be updated to be consistent with AAPA certificate.

Pg 151

22. Records show use of Newcastle Creek crossing or other creek/drainage crossing does not significantly cause material change to the shape of a waterway, the volume, speed or direction of flow or likely flow of water in or into a waterway, or alteration to the stability of the bed or banks of a waterway. No legal action against Sweetpea for maintaining Newcastle Creek, outside the bounds of RWA2 conditions

Where are these records to show that crossing Newcastle Creek does not cause material change, Sweetpea has an obligation to ensure no damage occurs to Newcastle Creek**, the AAPA certificate is applicable to the entire length of the creek**, and Sweetpea has no authority to cross the creek, this has to be updated.