

Prepared for
Sweetpea Petroleum Pty Ltd
ABN: 42 074 750 879



Greenhouse Gas Abatement Plan

EP136 - Beetaloo Sub-Basin, NT

04-Aug-2022

Greenhouse Gas Abatement Plan

EP136 - Beetaloo Sub-Basin, NT

Client: Sweetpea Petroleum Pty Ltd

ABN: 42 074 750 879

Prepared by

AECOM Australia Pty Ltd

Level 3, 9 Cavenagh Street, Darwin NT 0800, GPO Box 3175, Darwin NT 0801, Australia

T +61 8 8942 6200 F +61 8 8942 6299 www.aecom.com

ABN 20 093 846 925

04-Aug-2022

Job No.: 60667354

Quality Information

Document Greenhouse Gas Abatement Plan

Ref 60667354

Date 04-Aug-2022

Prepared by Scott Crabtree

Reviewed by Alana Court, David Close and Gibson Porkime

Revision History

Rev	Revision Date	Details	Authorised	
			Name/Position	Signature
0	21-Jul-2022	SWP4-2 EMP inclusion based on NTG Agency and Public Feedback	Gibson Porkime Northern Territory Operations Manager	
			David Close Vice President, Operations & External Affairs	
1	04-Aug-2022	SWP4-2 EMP minor update	Gibson Porkime Northern Territory Operations Manager	
			David Close Vice President, Operations & External Affairs	

Table of Contents

1.0	Introduction	1
2.0	Project Overview	1
3.0	Greenhouse Gas Abatement Plan	2
	3.1 Carbon offset plan for residual GHG emissions	5
4.0	Greenhouse Gas Estimate	7
	4.1 Cumulative GHG Emissions Estimates for FY2022-23 to FY 2025-26	9

List of Tables

Table 1	Sweetpea GGAP	2
Table 2	Estimated Greenhouse Gas Emissions for DST Program – FY2022-23 to FY2025-26	7
Table 3	Cumulative Gas Emissions Estimates for Sweetpea’s Exploration Activities – FY2022-23 to FY 2025-26	9

1.0 Introduction

Sweetpea Petroleum Pty Ltd (Sweetpea), is proposing to carry out onshore gas exploration in the Barkly Region, Northern Territory (NT), specifically the area delineated under Exploration Permit 136 (EP136) in the Beetaloo Sub-basin. Sweetpea are the Title Holder and Operator of EP136 and a fully owned subsidiary of Tamboran Resources Ltd (Tamboran).

The Northern Territory Government recently released *Greenhouse Gas Emissions Management for New and Expanding Large Emitters Policy* (referred to herein as the Large Emitters policy) which identifies the minimum requirements for the management of greenhouse gas emissions from new or expanding industrial and land use development projects. The Policy has been established in recognition of the Northern Territory's target of net zero greenhouse gas emissions by 2050.

Sweetpea's activities are proposed to commence in 2022 and may result in emissions that exceed 100,000 tCO₂e in a given financial year. In accordance with the Large Emitters policy, Sweetpea is required to submit a Greenhouse Gas Abatement Plan (GGAP) to the Department of Environment and Water Security (DEPWS) outlining how Sweetpea's GHG emissions will be mitigated and managed during the proposed activity. The GGAP will also demonstrate how Sweetpea will contribute to the Territory's target of net zero emissions by 2050 for the planned activities within EP136.

Flaring activities will produce the majority of emissions as part of this program, however flaring is required to evaluate the commercial viability of the resource. It is anticipated that combustion of gases via flaring can reduce emissions by 96% when compared to venting.

This document fulfils the GGAP requirements.

2.0 Project Overview

Sweetpea intend to conduct the regulated well activities and associated activities at seven exploration lease pads within the north of EP136 on Tanumbirini Station.

The regulated well activities including the associated activities are planned to commence in mid-2022 and proposed to be continued over a multi-year period. Sweetpea propose to commence rig mobilisation from mid-2022 and commence the first exploration drilling activities around Q3 2022. Hydraulic fracture stimulation (HFS) activities will not commence until later in the year, with well testing activity to follow directly after the completion of HFS activities and continue into 2023.

Sweetpea proposes to commence drilling a vertical pilot exploration well and horizontal exploration well on Lease Pad 1 (Maverick T463 A1-1H) in the northern area of EP136. Sweetpea plans to drill one vertical and horizontal well pair (i.e. a single well head) in 2022 and then continue the exploration drilling program in 2023, onwards, as outlined below. The timing of future drilling programs will be dependent on funding, timing of necessary approvals and schedule. Each well is estimated to take up to 70 days to drill, up to approximately 30 days for HFS, followed by well testing over 30-90 days. However, approval is sought for the possibility of testing up to 300 days if well testing data are ambiguous and a greater volume of data are required to inform future exploration and appraisal activities, this is considered more likely on earlier wells in this seven-well exploration program. HFS and well testing of Maverick T463 A1-1H on Lease Pad 1 the drilled well could occur in late 2022 or early 2023 pending timing of rig release, approvals and baseline water monitoring, and other necessary preparations.

This GGAP covers the proposed regulated activities required to enable Sweetpea to conduct activities as outlined in its Well Drilling, Hydraulic Fracture Stimulation and Well Testing Environment Management Plan.

3.0 Greenhouse Gas Abatement Plan

The requirements of the GGAP are described in Sweetpea Petroleum’s Well Drilling, Hydraulic Fracture Stimulation and Well Testing Environmental Management Plan, EP 136 Beetaloo Sub-basin, NT and are summarised in Table 1.

Table 1 Sweetpea GGAP

Requirement	Sweetpea’s GGAP
<p>1. A brief description of the project</p>	<p>Section 1.3 of the EMP provides the project description. A summary includes:</p> <ul style="list-style-type: none"> • Vegetation clearing and civil construction for camp expansion (increase 1.2 ha). • Camp operations. • Transport on permit. • Exploration activities at up to seven well pads, including: <ul style="list-style-type: none"> - Vertical and horizontal well drilling. - Hydraulic fracture stimulation. - Production testing and follow up testing, monitoring, and work-over activities, including flaring. - Management of wastewater. - Routine and ongoing maintenance of any infrastructure and or services. - Completions.
<p>2. An estimate of the project’s net scope 1 emissions and how these emissions will contribute to the Territory’s overall emissions profile</p>	<p>Scope 1 emissions under this EMP are provided in Section 4 . Greenhouse gas (GHG) emissions have been estimated to range from 96,242 tCO₂-e per annum in year 1 up to 217,611 tCO₂-e per annum in year 4.</p> <p>Flaring activities produce over 93% of the anticipated emissions as part of the DST program, however it is noted that flaring is required to evaluate the commercial viability of the resource. It is anticipated that combustion of gases via flaring will reduce emissions by 96% when compared to venting. It is also noted that the estimates presented are based on worst case emissions scenario. Flaring will largely be avoidable once pipeline capacity to take gas to markets is constructed.</p> <p>The potential emissions calculated for Sweetpea’s exploration program represents between 0.47% to 1.06% of the total annual GHG emissions reported for the NT by the Commonwealth <i>National Inventory Report</i> (inventory year 2019) of 20.6 million tonnes CO₂-e (Department of Industry, Science, Energy and Resources, 2019).</p> <p>On a regional, national and activity perspective, the emissions from the Gas Industry during Beetaloo exploration are not considered significant and are a critical part of the transition to lower carbon intensity energy and also as an input into many critical elements of the modern economy (e.g. fertilisers). The GISERA life cycle assessment identifies that the current net climate benefits of using natural gas in replacing coal for electricity generation is up to 50% less GHG emissions (Heinz 2019).</p> <p>The IEA Net Zero scenario anticipates substantial gas production will still be critical in 2050, and currently there is a risk that there is insufficient investment to ensure that sufficient gas will be available for domestic and global markets. Gas in the Asia-Pacific can help decarbonise electricity markets and reduce CO₂ emissions and atmospheric pollution providing better air quality to major population centres.</p>

Requirement		Sweetpea's GGAP
3.	An estimate of the project's net scope 2 emissions and how these emissions will contribute to the Territory's overall emissions profile	No scope 2 emissions are associated with Sweetpea's planned exploration program.
4.	An estimate of the project's scope 3 emissions	Scope 3 emissions are indirect GHG emissions generated in NT that are a consequence of Sweetpea's regulated activities associated with supply of materials and equipment. Scope 3 GHG emissions associated with suppliers in the NT are expected to be limited to liquid fuel (diesel) used for transportation and logistics.
5.	An overarching long-term emissions target for the project that represents a meaningful contribution to the Territory's net zero emissions target	Sweetpea's long-term target within the Beetaloo Sub-basin is to have a scope 1 and scope 2 neutral development.
6.	Regular interim targets that establish a trajectory to achieving the overarching target and the methods that will be applied to achieve the interim targets	Not applicable. Interim targets are not appropriate for exploration and appraisal projects.
7.	An explanation of, and justification for, the proposed long-term and interim targets and how these will make a meaningful contribution to the Territory's emissions target	<p>Interim targets are not appropriate for exploration projects due to the high degree of uncertainty, the requirement to test and produce hydrocarbons to determine technical and commercial viability of a potential development and the inability to beneficially re-use hydrocarbons due to legislative and infrastructure constraints within the NT.</p> <p>Interim and long-term targets are more appropriate where produced hydrocarbons have the ability to be utilised (i.e. through use or sale of product to minimise flaring) or where a project is in the operating phase where emission certainty is higher.</p>
8.	A demonstration that all reasonable and practical measures have been applied to avoid and mitigate emissions through best practice design, process, technology and management	<p>Greenhouse gas emissions during well testing are required to be generated to prove the commerciality of a potential resource. Well testing data is utilised to generate a well's Estimated Ultimate Recovery (EUR). The EUR determines how many wells are required to be drilled and how often future development wells are required to maintain production levels (i.e. as wells decline over time).</p> <p>The minimum required well testing (or piloting) duration for unconventional gas development varies depending on a number of factors, greater data are required to forecast this. The more test data on production, the lower the commercial risk of a development.</p>

Requirement		Sweetpea's GGAP
		<p>The mitigation of emissions has been undertaken through:</p> <ul style="list-style-type: none"> • Minimising well test durations as far as reasonably practicable to assess data. It is noted that Sweetpea DST EMP propose 60, 90 or 300 day test periods. • Utilisation of the best practice emission management controls outlined in the Code of Practice. <p>It is noted that Sweetpea are not legally permitted to beneficially re-use produced hydrocarbons under an Exploration Permit. This results in flaring being the only technically feasible hydrocarbon management approach to implement for this program. Should this change, Sweetpea would investigate options for beneficial reuse and are actively pursuing early commercialisation to minimise the period where flaring is required.</p>
9.	A description of all strategies proposed to avoid, mitigate and offset the project's scope 1 and scope 2 emissions	<p>Section 7.8 Air Quality and Emissions Subplan in the EMP provides the mitigations for GHG emissions. The controls include the adoption of the mandatory requirements detailed in the Code of Practice which requires:</p> <ul style="list-style-type: none"> • The development and implementation of a methane emission management plan (D5.1) (refer Appendix E of the EMP) • Restrictions on venting (D.5.9) • Use of a Reduced Emissions Completion (REC) (D.5.9) • Implementation of a routine Leak Detection and Repair Program (D.5.3.) • Pressure and gas testing to ensure any leaks are identified and fixed prior to commission (D.5.9) • Flanges, valves and fittings are all API compliant and gas tight (D.5.9) • Equipment is appropriately sized and regularly maintained to minimise diesel wastage (D.5.9) • Routine site inspections and assurance undertaken to ensure equipment is maintained and operated as per manufacturers requirements. • Carbon offset plan for residual GHG emissions.
10.	Flexibility to review mitigation actions and abatement plans so they can be improved and updated to enable further emissions reductions going forward	<p>Sweetpea will continue to look for opportunities to mitigate carbon emissions throughout the project. Given the mandatory controls outlined in the Code of Practice and inability to beneficially re-use produced hydrocarbons at this point in time, additional abatement measures are considered limited.</p> <p>Should this change, Sweetpea would investigate options for beneficial reuse of the produced hydrocarbons.</p>
11.	A schedule for periodic public reporting on implementation and progress against the interim and overarching targets and any changes that have had to be made to the strategies proposed	<p>Sweetpea is required under condition D.6.2 of the Code of Practice to report its GHG emissions to DEPWS on an annual basis (Section 8.4.1 of the EMP). In this report, Sweetpea will assesses the level of greenhouse gas emissions against its EMP estimated levels detailed in Section 4 to demonstrate it has met its performance standards.</p>

Requirement		Sweetpea's GGAP
	in the GGAP to deliver on the targets	
12.	Information about the project's obligations under the Australian Government's <i>National Greenhouse and Energy Reporting Act 2007</i> and any expected baseline determinations	Sweetpea will be required to undertake NGRS reporting where GHG emissions exceed the 25,000 tCO ₂ -e threshold and will be covered by the safeguard mechanism if emissions exceed a 100,000 tCO ₂ -e threshold (during a financial year period). A baseline emission intensity will be generated for Sweetpea's activities.
13.	A timetable for review that is considerate of the project's lifespan and the identified interim and overarching targets	The emissions associated with the project will be reviewed annually.

The Methane Emission Plan has been prepared (Appendix E of the EMP) to detail the measures Sweetpea will undertake to conduct methane emissions monitoring, leak management, detection and reporting over the duration of the exploration program and the requirement of annual reporting.

3.1 Carbon offset plan for residual GHG emissions

The carbon offset commitment included in this GGAP is applicable if Sweetpea's activities exceed the Large Emitter Policy threshold of 100,000 tCO₂e in a financial year. If emissions stay below the 100,000 tCO₂e threshold, Sweetpea's activities will not be covered by the Large Emitter Policy and will not have obligations to offset emissions.

In the absence of broader industry engagement and as a starting point, Sweetpea proposes the following carbon offset targets within the GGAP:

- That residual GHG emissions be offset using credible carbon credit units approved by the Commonwealth Clean Energy Regulator or the Climate Active Carbon Neutral Standard.
- Minimum carbon offset levels shall increase year-on-year by 3.7% (based on a baseline financial year of 2023) to result in a linear decrease in GHG emission levels to net zero by 2050 as per the following schedule:
 - Financial year 2023: offset 3.7% of residual GHG emissions
 - Financial year 2024: offset 7.4% of residual GHG emissions
 - Financial year 2025: offset 11% of residual GHG emissions
 - Financial year 2026: offset 14.7% of residual GHG emissions
- Actual emission levels produced during a financial year must be estimated in accordance with the National Greenhouse and Energy Reporting Scheme (NGERS) reporting methodology.
- Offsets volumes shall be calculated retrospectively, by multiplying the actual emission volumes generated during a financial year with the corresponding financial year offset % requirement level.
- Offsets shall be secured and retired within 6 months of the end of a financial year.
- An appropriately qualified independent person with extensive carbon accounting experience shall verify the actual emission levels generated, the procurement and retirement of the required offset volumes for emission generated in the specified financial year.

- To ensure companies operating in the NT do not pay for the same GHG emission twice, carbon offsets used to fulfill obligations under the Federal Government Safeguard Mechanism will be counted towards a company's GAAP offset commitment.
- A report from the appropriately qualified independent person shall be provided to DEPWS by January 31 each year verifying the actual emission levels estimated and confirming the required offset for the previous financial year have been acquired and retired.
- That the GGAP is updated annually based on actual emissions from the preceding year to ensure currency.

4.0 Greenhouse Gas Estimate

The GHG emissions estimate for the DST program is presented in Table 2. The emissions have been estimated using tools developed for the National Greenhouse and Energy Reporting scheme and assumptions based on similar exploration programs in the Beetaloo Sub-basin. It is noted that the GHG reporting period is based on financial years.

Table 2 Estimated Greenhouse Gas Emissions for DST Program – FY2022-23 to FY2025-26

Source of GHG Emissions	Assumption	GHG Emissions (tCO ₂ -e)				Total (tCO ₂ -e)
		FY2022-23	FY2023-24	FY2024-25	FY2025-26	
		1	3	3	-	
Vegetation clearance for camp expansion	1.2 ha of shrubs and trees to be cleared for expansion of camp pad. Based on the FullCAM Model.	92	-	-	-	92
Civil construction activity for camp expansion only (all other construction covered by Seismic EMP and C&WB EMP)	Civil Construction fuel consumption averages 80L/hr (¾ load average) over a 12-hour day (~4.8 KL diesel oil over 5 days to complete camp expansion. Estimate based on the Emissions and Energy Threshold Calculator – 2018. Diesel oil (post-2004 vehicles)	13	-	-	-	13
Diesel combustion-Camp Operations	Camp Operations (est. 240 days per year). Fuel consumption averages 15 L/hr with generator running 24 hours per day. Camp operations carried out over a maximum of 720 days. Estimate based on the Emissions and Energy Threshold Calculator – 2018. Diesel oil (post-2004 vehicles)	234	234	234	294	996
Diesel combustion – transport on permit area	Assumes on Permit transport based on up to 200 L per day (est. 240 days/year for Year 1, Year 2 and Year 3). Estimate based on the Emissions and Energy Threshold Calculator – 2018. Diesel oil (post-2004 vehicles)	131	131	131	131	524
Diesel combustion - horizontal and vertical drilling	Assumes 500 KL of diesel used per well based on Table 2.4.2A Emission and energy content factors - liquid fuels and certain petroleum-based products for stationary purposes - NGERs 2017-18 Technical guidelines for the estimation of greenhouse gas emissions by facilities in Australia – Diesel. Drill 1 well in Year 1, 3 wells in Year 2 and 3 well in Year 3.	1,355	4,065	4,065	-	9,485

Source of GHG Emissions	Assumption	GHG Emissions (tCO ₂ -e)				Total (tCO ₂ -e)	
		FY2022-23	FY2023-24	FY2024-25	FY2025-26		
		1	3	3	-		
Diesel combustion – HFS and completions	HFS spread average fuel consumption is 8,000L/day for 6 days per well plus an additional 4,000 L for completion rig consumption. Estimate based on the Emissions and Energy Threshold Calculator – 2018. Diesel oil (post-2004 vehicles)	229	897	897	-	2,093	
Fugitive emissions – Drill Cuttings, Venting and Wastewater Storage	Drill cutting assumed estimated cutting volume by the NGERs Global Warming Potential of 28 tCO ₂ -e/tCH ₄ . Venting assumed 2 completion days per well GHG Emissions Methodologies for the Oil and Gas Industry; American Petroleum Institute (API), 2020-21 NGERs completion factor of 25.9 tCH ₄ per day multiplied by NGERs Global Warming Potential of 28tCO ₂ e/tCH ₄ . Wastewater storage emissions based 10 ML per well multiplied by Table 5-10 produced saltwater tank methane flashing emission factors - Compendium of Greenhouse Gas Emissions Methodologies for the Oil and Gas Industry; American Petroleum Institute (API), 2020-21 emission factor of 0.39 tCH ₄ /ML multiplied by NGERs Global Warming Potential of 28 tCO ₂ -e /tCH ₄ .	2,900	8,702	8,702	-	20,304	
Flaring – natural gas emissions during EPT	For the purposes of this EMP, the emission CO ₂ estimates are based on 2 EPTs up to 300 days, 2 EPTs up to 90 days and 3 EPTs up to 60 days. Estimates are based on forecast success case production rates multiplied by Method 1 section 3.44. GHG reported by financial year, as such 300-day EPT in year 1 is likely to extend over two reporting periods. Two flare rates presented based on 3.181 TJ/day and 5.302 TJ/day.	3.181 TJ/day	91,218	104,250	91,218	130,312	416,998
		5.302 TJ/day	152,031	173,749	152,031	217,186	694,997
Total DST Program GHG Emissions based on 3.181 TJ/day		96,242	118,279	105,247	130,737	450,505	
Total DST Program GHG Emissions based on 5.302 TJ/day		156,950	187,778	166,060	217,611	728,399	

4.1 Cumulative GHG Emissions Estimates for FY2022-23 to FY 2025-26

GHG emissions from the well drilling, hydraulic fracture stimulation and well testing, and associated activities have been estimated using the threshold calculator developed for the National Greenhouse and Energy Reporting scheme.

Sweetpea are required to report under the Large Emitters Policy for scope 1 emissions if they equal or exceed the 100,000 tCO₂-e in any financial year over the life cycle of a project, not counting emissions generated from land clearing directly associated with the project.

The GHG estimates for the regulated activities and associated activities under the EMP over the planned program is provided in Table 3.

Table 3 Cumulative Gas Emissions Estimates for Sweetpea's Exploration Activities – FY2022-23 to FY 2025-26

Program	Maximum GHG Emission Estimates (tCO ₂ -e)	GHG emissions compared to:	
		NT total GHG emissions*	Australia's total GHG emissions^
Seismic Exploration and Water Bore EMP (SWP1-04 and modification)	5,377	0.026%	0.001%
Civil Construction and Water Bore EMP (SWP2-03)	13,400 - 14,909	0.065%	0.003%
Well Drilling, Hydraulic Fracture Stimulation and Well Testing (SWP4-1)	450,505 - 728,399 (Range of 96,242 to 217,611 tCO ₂ -e per annum)	2.187%	0.145%
Total Exploration 4-year Program GHG Emission Estimate Range	469,282 – 748,685		

*Northern Territory *National Inventory Report* (inventory year 2019) of 20.6 million tonnes CO₂-e (Department of Industry, Science, Energy and Resources, 2019)

^Commonwealth *National Greenhouse Gas Inventory Quarterly Update: September 2021* of 501.5 million tonnes CO₂-e (Department of Industry, Science, Energy and Resources, 2022)

Total greenhouse gas (GHG) emissions generated over the entire 4-year program for all DST activities and associated activities is anticipated to range from 469,282 to 748,685 tCO₂-e (tonnes of Carbon Dioxide equivalent). The well testing activities equates to 93% to 95% of all GHG emissions produced over the four-year program. The annual range of GHG emissions for the DST program is 96,242 to 217,611 tCO₂-e per annum or 0.47% to 1.06% of the total annual greenhouse gas emissions reported for the NT by the Commonwealth *National Inventory Report* (inventory year 2019) of 20.6 million tonnes CO₂-e (Department of Industry, Science, Energy and Resources, 2019) or 0.019% to 0.043% of the total Australian annual greenhouse gas emissions reported in the most recent Inventory update of 501.5 million tonnes of CO₂-e.