ANNUAL MONITORING REPORT – YGP EPL230-01 (10/2/2023 – 9/2/2024)

					Joe Covic 2024.03.08 14:36:21 +08'00'			
PR-OP	00	07/03/2024	Issued for Information	SALL	JCO	GPA		
Validity Status / Revision index	Rev. Number	Date	Description	Prepared by	Checked by	Approved by	Contractor Approval	Company Approval

eni australia	Project name **BLACKTIP OPERATIONS**	Company identification 000036_DV_PR.HSE.1210.000 Job N. ___
		Contractor identification Contract ___
(Vendor logo and business name)		Vendor identification …… Order N……
Facility Name BLACKTIP	Location AUSTRALIA WA-33-L	Scale: 1:1 / Sheet of Sheets: 1 / 93
Document Title **Annual Monitoring Report – (2023-2024)**		Supersedes N…… Superseded by N……
		Plant Area / Plant Unit

REVISION HISTORY

Rev.	Date	Nr. of sheets	Description
00	07/03/24	93	Issued for Information

TABLE OF CONTENTS

TABLES

FIGURES

ATTACHMENTS55

1. EXECUTIVE SUMMARY

The Blacktip Annual Monitoring Report 2023 summarises the environmental performance of the Blacktip Yelcherr Gas Plant (YGP) for the reporting period 10 February 2023 to 9 February 2024. It makes this comparison against the Environmental Protection Licence (EPL) 230-01.

At times, this Report provides information required for licence anniversary reporting, with a 10 Feb 2023 to 9 Feb 2024 period. At other times, information is reported in Financial Year terms, based on NGER reporting (July to June). Where anniversary or financial year reporting is used, it is clearly marked.

This Report accompanies the Annual Return, which provides a summary of the compliance against the EPL.

1.1 Production

Production output for the reporting period (Calendar year) was:

- Gas production was 390.6 kSCM;
- Annual Gas production was 297.976 ktonnes; and
- Condensate production was 302.331 ktonnes.

1.2 Discharges to Water

- Offshore produced water monitoring (in part for model validation) was conducted in June 2023;
- Annual shellfish and sediment monitoring was conducted in November 2023 with the results consistent across sampling sites, with little variation between the control and monitoring sites, providing confidence that there are no adverse impacts from produced water discharge to the environment;
- Increased volume of PW discharge occurred in 2023; and
- Non-compliances with limits and trigger values are outlined in Table 10.1. This includes Produced Water limits for Oil in Water, Manganese, Zinc, Copper, Naphthalene, Benzene, Toluene, Ethylbenzene, and Xylene (m+p);

1.3 Discharges to Air

- Total greenhouse gas emissions from Yelcherr Gas Plant calculated in the latest NGER reporting period (July to June) were 28,550 tCO2-e; and
- Total volume of gas flared was 2,140 KSCM, with an average daily rate of 8.5 KSCM/d, compared with 5.86KSCM/d in the previous licence period.

1.4 Discharges to Land

<u>Liquid waste discharges – treated wastewater</u>

- A total of 2.9ML of treated wastewater effluent was reused for irrigation; and
- Non-compliances with limits and trigger values are outlined in Table 10.1. This includes trigger values for Oil in Water, pH, E.coli, BOD and TSS.

Liquid waste discharges – stormwater

- Non-compliances with the trigger value for oil in water, occurred on 6 occasions; and
- Oil in water typically ranged between 0-4.8 mg/l.

1.5 Groundwater

- A total of 15.3ML was abstracted for potable water use; and
- All quarterly monitoring results were within the Australian Drinking Water Guidelines and ANZECC guidelines.

1.6 Waste Management

- Blacktip operations generated an approximate total of 225.92 tonnes of hazardous waste, and 30.83 tonnes of non-hazardous waste.

1.7 Non-Conformances

Non-Conformances recorded in 2023/2024 are reported in the Annual Return and recorded below in Table 1.1.

Table 1.1: 2023/2024 Non Conformances

Date of NC	Date detected	Licence Number	Clause breached	Agency	Case Description	Case Number	NC Description / remarks
14-Feb-23	04/04/23	EPL230-01	Condition 28	NTEPA	Blacktip - YGP - Non-compliance with EPL230-01 - Produced Water and Wastewater Discharge	186534	PW above EPL Limit for OiW, Copper (Filtered), Copper (Total), Toluene, Ethylbenzene, Xylene,
28/03/23	15/05/23	EPL230-01	Condition 28	NTEPA	Blacktip - YGP - Non-compliance with EPL230-01 - Produced Water and Wastewater Discharge	182863	PW above EPL Limit for TSS, Copper (Filtered), Copper (Total), Toluene, Ethylbenzene, Xylene, PW above trigger values over three consecutive samples for OiW, Benzene, and Zinc (Total). WW above EPL Limit for TSS and OiW.
12/04/23	27/06/23	EPL230-01	Condition 28	NTEPA	Blacktip - YGP - Non-compliance with EPL230-01 - Waste Water Discharge	186514	WW above EPL limits for BOD, TSS and E. Coli
16/04/23	27/06/23	EPL230-01	Condition 28	NTEPA	Blacktip - YGP - Non-compliance with EPL230-01 - Produced Water Discharge	186526	PW above EPL Limits for Toluene, Xylene, Naphthalene and Total Copper, PW above Trigger Values for 3 consecutive periods for Zinc (Total and Filtered) and Copper (Filtered)
14/05/23	29/05/23	EPL230-01	Condition 28	NTEPA	Blacktip - YGP - Non-compliance with EPL230-01 - Produced Water and Wastewater Discharge	186689	PW above EPL Limits for Toluene, Xylene, and Copper (Total and Filtered), WW below pH and above OiW limits.
15/06/23	20/07/23	EPL230-01	Condition 28	NTEPA	Blacktip - YGP - Non-compliance with EPL230-01 - Waste Water Discharge	189300	WW above EPL limits for TSS
19/06/23	20/07/23	EPL230-01	Condition 28	NTEPA	Blacktip - YGP - Non-compliance with EPL230-01 - Produced Water Discharge	189305	PW above EPL Limits for OiW, Mn (Dissolved and Total), Toluene, Ethylbenzene, and Xylene (m+p)
13/07/23	18/08/23	EPL230-01	Condition 28	NTEPA	Blacktip - YGP - Non-compliance with EPL230-01 - Waste Water Discharge	191247	WW above EPL limits for BoD
16/07/23	18/08/23	EPL230-01	Condition 28	NTEPA	Blacktip - YGP - Non-compliance with EPL230-01 - Produced Water Discharge	191246	PW above EPL Limits for OiW, Toluene, Ethylbenzene, and Xylene (m+p), Copper (dissolved and total), Mn (dissolved and total), Toluene, Ethylbenzene, and Xylene (m+p)
05/08/23	18/09/23	EPL230-01	Condition 28	NTEPA	Blacktip - YGP - Non-compliance with EPL230-01 - Produced Water Discharge	193306	PW above EPL Limits for Toluene, Xylene (m+p), Zinc (dissolved and total), pH
15/08/23	18/09/23	EPL230-01	Condition 28	NTEPA	Blacktip - YGP - Non-compliance with EPL230-01 - Waste Water Discharge	193307	Blacktip - YGP - Non-compliance with EPL230-01 - Waste Water monitoring parameters measured above limits.
12/09/23	27/10/23	EPL230-01	Condition 28	NTEPA	Blacktip - YGP - Non-compliance with EPL230-01 - Produced Water Discharge	196767	PW above EPL Limits for Toluene, Xylene (m+p), Zinc (dissolved and total), Manganese (dissolved and total), Copper (dissolved and total), and OiW
07/11/23	30/11/23	EPL230-01	Condition 28	NTEPA	Blacktip - YGP - Non-compliance with EPL230-01 - Produced Water Discharge	200146	PW above EPL Limits for Toluene, Xylene (m+p), Zinc (total), Manganese (dissolved and total)
08/11/23	30/11/23	EPL230-01	Condition 28	NTEPA	Blacktip - YGP - Non-compliance with EPL230-01 - Waste Water Discharge	200151	WW above EPL limits for TSS
10/10/23	21/11/23	EPL230-01	Condition 28	NTEPA	Blacktip - YGP - Non-compliance with EPL230-01 - Produced Water Discharge	199410	PW above EPL Limits for Toluene, Ethyl benzene, Xylene (m+p), Zinc (dissolved and total), Manganese (dissolved and total)
10/11/23	10/11/23	EPL230-01	Condition 19.1 & 19.2	NTEPA	Blacktip-YGP-LOPC- [Reported to NTEPA] During transfer of sludge from main tank to ISO tanks the transfer hose parted and sludge spilled to grade	198443	During transfer of sludge from main tank to ISO tanks the transfer hose parted, and sludge spilled to grade
13/12/23	19/01/24	EPL230-01	Condition 28	NTEPA	Blacktip - YGP - Non-compliance with EPL230-01 - Waste Water Discharge	206992	Wastewater monitoring parameters measured above limits for TSS, 50 mg/l (EPL limit = 30mg/l)
18/12/23	19/01/24	EPL230-01	Condition 28	NTEPA	Blacktip - YGP - Non-compliance with EPL230-01 - Produced Water Discharge	206993	Produced Water monitoring parameters measured above limits for copper (filtered), Copper (total), Zinc (total), Toluene and Xylene.
17/01/24	16/02/24	EPL230-01	Condition 28	NTEPA	Blacktip - YGP - Non-compliance with EPL230-01 - Waste Water Discharge		Wastewater above EPL limits for E. Coli
22/01/24	16/02/24	EPL230-01	Condition 28	NTEPA	Blacktip - YGP - Non-compliance with EPL230-01 - Produced Water Discharge		Produced Water above EPL Limits for OiW, Toluene, Ethylbenzene, and Xylene (m+p), Copper (dissolved and total), Mn (dissolved and total), Toluene, Ethylbenzene, and Xylene (m+p).

1.8 Community initiatives

Eni continues to maintain a positive and engaging relationship with the Thamarrurr Rangers, who deliver local environmental monitoring services such as, but not limited to:

- Monitoring of offshore assets (e.g. Single Point Mooring (SPM) and hose);
- Wild fire management;
- Controlled burning;
- Weed and pest monitoring and eradication;
- Marine monitoring;
- Sea turtle monitoring;
- Fauna monitoring and relocation;
- Provision of vessel and crew for offshore environmental sampling;
- Emergency Response: Initial Oil Spill Monitoring Capabilities;
- PW-01 (Produced Water discharge point) monitoring; and
- Containers for Change (plastic bottle recycling).

1.9 Continuous improvement

The following activities were completed during the reporting period to continually improve compliance to EPL230-01 requirements:

- A Comprehensive annual fugitive emissions survey to monitor for gas leaks across YGP was conducted in November 2023;
- A Comprehensive annual venting validation survey to monitor venting sources at YGP was conducted in November 2023;
- A hydrogeological survey was undertaken at YGP (November 2023) to establish an assessment of potential risk to groundwater and provide a third monitoring location to allow improved assessment of groundwater;
- Thamarrurr Rangers participated water outfall sampling training to be used for future sampling exercises;
- A trial skid to remove metalloids from Produced Water has been engineered in preparation for installation in Q2 2024;
- An emergency exercise has been carried out at YGP involving and assessing the Thamarrurr Rangers in first responder capabilities in the event of a hydrocarbon spill in the offshore area (off shore water sampling and monitoring);
- An in depth energy efficiency assessment in accordance with the requirements of ISO50001 was completed;
- Engaged a new third party contractor to conduct site based EPL230-01 monitoring and analysis programme;
- In accordance with Section 48(1), a third party consultant was engaged to conduct an independent environmental audit of the Yelcherr Gas Plant (YGP) on behalf of the NT EPA; and
- Company conducted an Environmental Audit and a 5 Yearly Performance Review of the wastewater treatment plant.

2. INTRODUCTION

This Report summarises the environmental performance of the Blacktip YGP for the reporting period 10th February 2023 to 9th February 2024, as required by condition 63 of the EPL.

Eni Australia Limited (Eni) is Operator of the Blacktip Gas Project in the Northern Territory. The development consists of a small unmanned offshore wellhead platform, a subsea pipeline bringing whole well stream fluid, (i.e., gas, condensate and produced water) to Yelcherr Beach and the Yelcherr Gas Plant (YGP) near Wadeye. The processed gas is exported via an onshore export pipeline, by Australian Pipeline Trust, to the customer, Power and Water Corporation.

Blacktip YGP commenced production on 26 August 2009. The operation of the YGP is licensed under the Environmental Protection Licence (EPL), EPL230-01, issued by the former Department of Natural Resources, Environment, The Arts and Sport (NRETAS) (now Northern Territory Environment Protection Authority (NT EPA) on 11th August 2009.

EPL230-01 (the current license) was issued to Eni as the most recent amendment to the EPL.

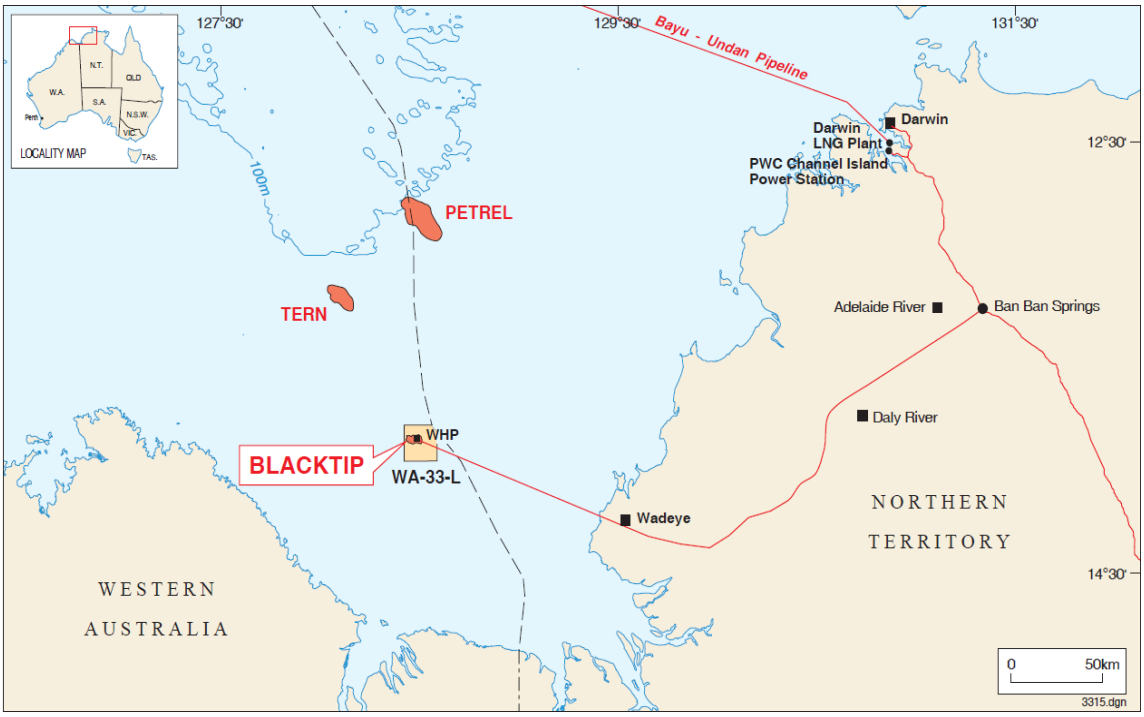


Figure 2.1: Blacktip Project locality map

2.1 Condition 64 requirements

This Report has been prepared in accordance with NT EPA 'Guideline for Reporting on Environmental Monitoring' and the requirements under condition 64 of the EPL, outlined below.

Table 2.1: EPL Condition Clause 64

Clause	EPL condition	Refer Section
64.1	include an updated description of gas plant infrastructure and processes	3.0
64.2	reports on total condensate produced and total gas processed by the gas plant;	4.0
64.3	reports on the quality of gas received by the plant;	4.4
64.4	includes a tabulation of all monitoring data required as a condition of this licence;	Appendices
64.5	includes a trend analysis and interpretation of all monitoring data required as a condition of this licence;	5.0, 6.0, 7.0, 8.0
64.6	includes a long-term trend analysis of monitoring data to demonstrate any environmental impact associated with the activity over a minimum period of three years;	5.0, 6.0, 7.0, 8.0
64.7	reports the total annual emissions for each emission point, as well as for condensate tanks and fugitive emissions.	7.0
64.8	reports the frequency and volume of wastewater discharges for the reporting period;	6.0
64.9	identifies the number of exceedances of trigger values and limits that have occurred during the reporting period, which includes a record of trigger value exceedances in accordance with condition 61;	1.7, Appendices
64.10	is prepared in accordance with the requirements of the NT EPA *Guideline for Reporting on Environmental Monitoring;*	
64.11	demonstrates continuous improvement in air emissions from the authorised air emissions points identified in Attachment 4;	7.0
64.12	demonstrates continuous improvement in wastewater quality from the authorised discharge points identified in Attachment 2.	5.0, 6.0

2.2 Program objectives

Wastewater streams emanating from the YGP include:

- Produced water;
- Sewage wastewater;
- Stormwater runoff from the utilities area; and
- Stormwater runoff from the Open Drains System (ODS).

The above streams may contain pollutants, which, if not properly managed, can enter the groundwater or surface waterways and result in soil and groundwater contamination. Therefore, wastewater must be managed appropriate in accordance with the Onshore Gas Plant Environmental Management Plan 000036_DV_EX.HSE.0684.000, and discharges are to be monitored for pollutants.

2.3 Site information

2.3.1 Site layout

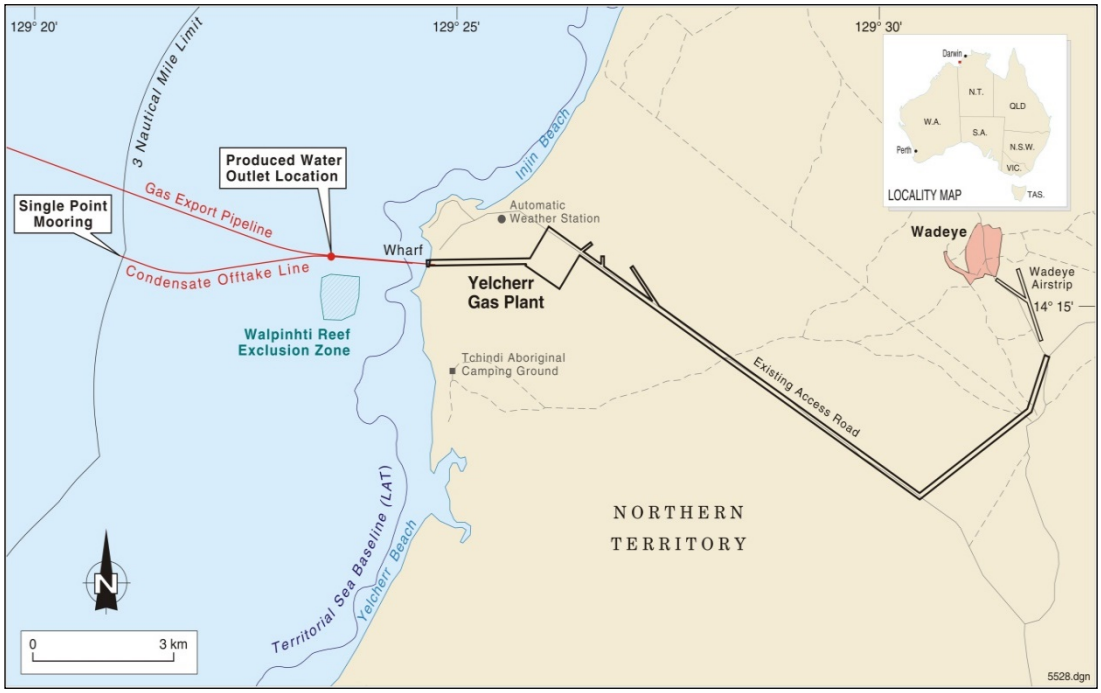


Figure 2.2: Blacktip Project layout

2.3.2 Environmental Context

Wadeye is located in the eastern (onshore) part of the Bonaparte Gulf Basin. The key geological/aquifer unit in the region is the Hyland Bay Formation, of Upper Permian age, which dips to the west (Laws & Brown, 1976). The unit is about 400m thick and was deposited in a deltaic environment during a period of marine transgression. Overlying the Hyland Bay Formation are undifferentiated sediments that have been heavily leached/altered to form a blanket cover of laterite and laterised clays and sandstones (Jamieson, 1991).

The uppermost sediments (in the Hyland Bay Formation) comprise weathered, fine to coarse, clean to clayey sandstone and rounded quartz gravels with interbeds of clay and siltstone. Fracturing within the Hyland Bay Formation sediments has resulted in the development of secondary permeability and highly permeable dual-porosity aquifers in this unit, which have been exploited by bores utilised for water supply by the Wadeye community (Jamieson, 1991). The aquifers are semi-confined to semi-unconfined, with pumping typically resulting in a delayed yield from surrounding sediments (Jamieson, 1991).

The lowermost sediments comprise pink to dark grey clays which are at least 50m thick. This clay unit sub-crops immediately to the east of Wadeye.

Geotechnical investigations undertaken by Advanced Geomechanics (AG, 2005) have confirmed that the general lithological sequence of sandstones, clayey/silty sands and gravels at the plant site is fairly consistent with the sequence found at Wadeye, although no gravels have been encountered at Wadeye.

Interpretation of a 10-day pumping test undertaken by AG (2005) (Figure 5) indicates that the aquifer in the area of the plant site has a transmissivity of around 1,300 m2/day, although the lack of measurement precision with which the test was undertaken causes some uncertainty in the estimated transmissivity. The groundwater level (elevation) at the time of the test in October 2004 was not provided but is estimated to be around +4 mAHD (based on section drawings showing bore elevations). Pumping at around 190kL/day resulted in a final drawdown of 0.2m. Jamieson (1991) reports a typical transmissivity of around 4,000m2/day in the Wadeye area and a specific yield of 10%.

Groundwater flows to the Northwest toward the Bonaparte Gulf coast and discharges as small springs in coastal creek/swamp areas. The hydraulic gradient is low and estimated to be about 0.1% (Jamieson, 1991). Based on the results of bore test data, Jamieson (1991) estimates that groundwater throughflows, (and hence coastal discharges to the sea and creek/wetland systems) are of the order of 1.5Mm3/yr/km.

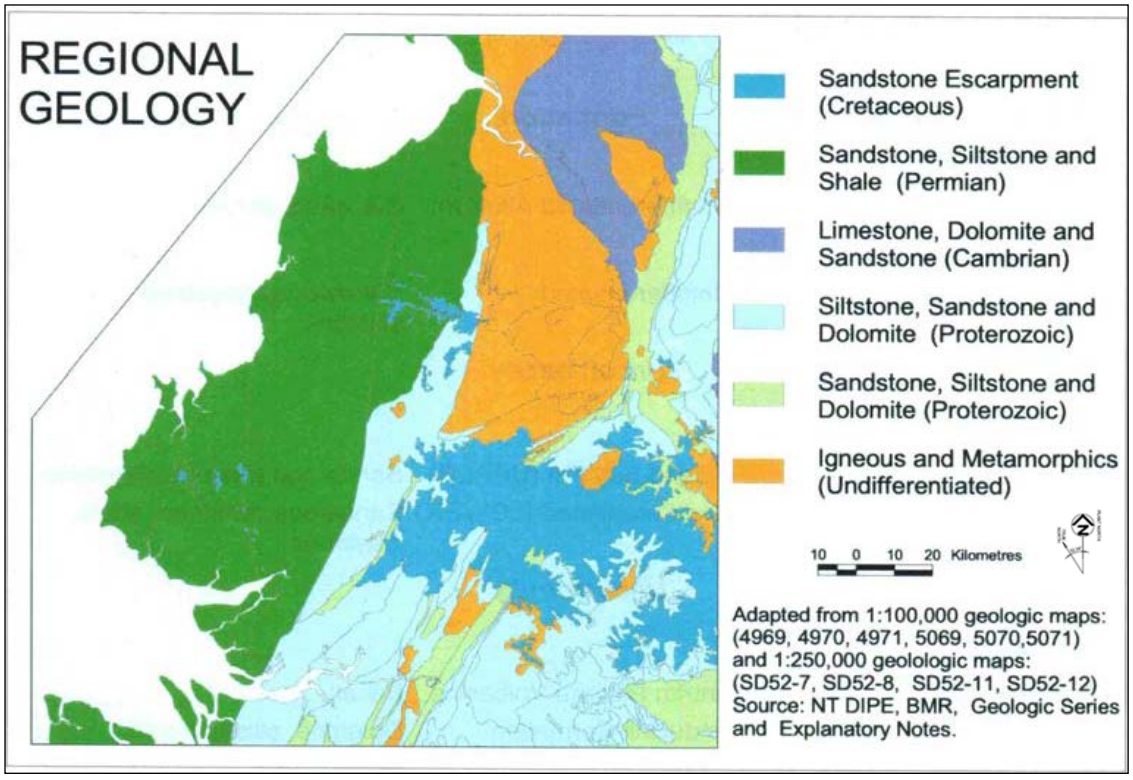


Figure 2.3: Regional Geology layout

Source of above information is Groundwater Management Plan - Blacktip Gas Project (Phase 1 Civil Works), EcOZ Environmental Services Pty Ltd, Sept 2006

3. OVERVIEW OF YELCHERR GAS PLANT

3.1 General overview

In accordance with condition 64.1 of EPL230-01, this section provides a description of the gas plant infrastructure and processes. Infrastructure at the YGP includes:

- A gas processing plant consisting of separation, gas dehydration, compression, condensate storage and produced water treatment facilities;
- The onshore portion of an 18" carbon steel, multi-phase pipeline bringing produced fluids from the offshore gas field to the YGP, starting from the shore crossing;
- The onshore portion of a condensate export pipeline from the condensate storage facilities at the YGP to the shore crossing; and
- A portion of the onshore gas export pipeline that runs from the gas processing plant to a custody transfer meter at the boundary of the YGP site.

3.2 Plant configuration

After processing, un-odorised natural gas at agreed specifications is delivered to the customer via an onshore export pipeline to a custody transfer meter at the boundary of the YGP, at a maximum delivery rate of 120 TJ/day.

Stabilised condensate is stored on site at the YGP before being exported to the SPM for offload via tankers.

The production life of the field is planned to be 25 years based on initial gas sales contract. The design life of the Blacktip YGP is 30 years.

The entire YGP site occupies an area of 750m by 750m, with the main process facility located to the south of the site (occupying an area of approximately 250m by 380m) and the accommodation, warehouse, offices, and control room to the north (see Figure 3.1). The coordinates of the YGP are shown in Table 3.1.

Table 3.1: YGP Coordinates

Corner	GDA 1994		GDA 1994 MGA Zone 52	
	East	North	mE	mN
W	129°25'52.09"	14°14'33.60"	546 510	8 425 393
N	129°26'05.87"	14°14'13.22"	546 924	8 426 018
E	129°26'26.77"	14°14'26.66"	547 549	8 425 604
S	129°26'12.99"	14°14'47.04"	547 135	8 424 979

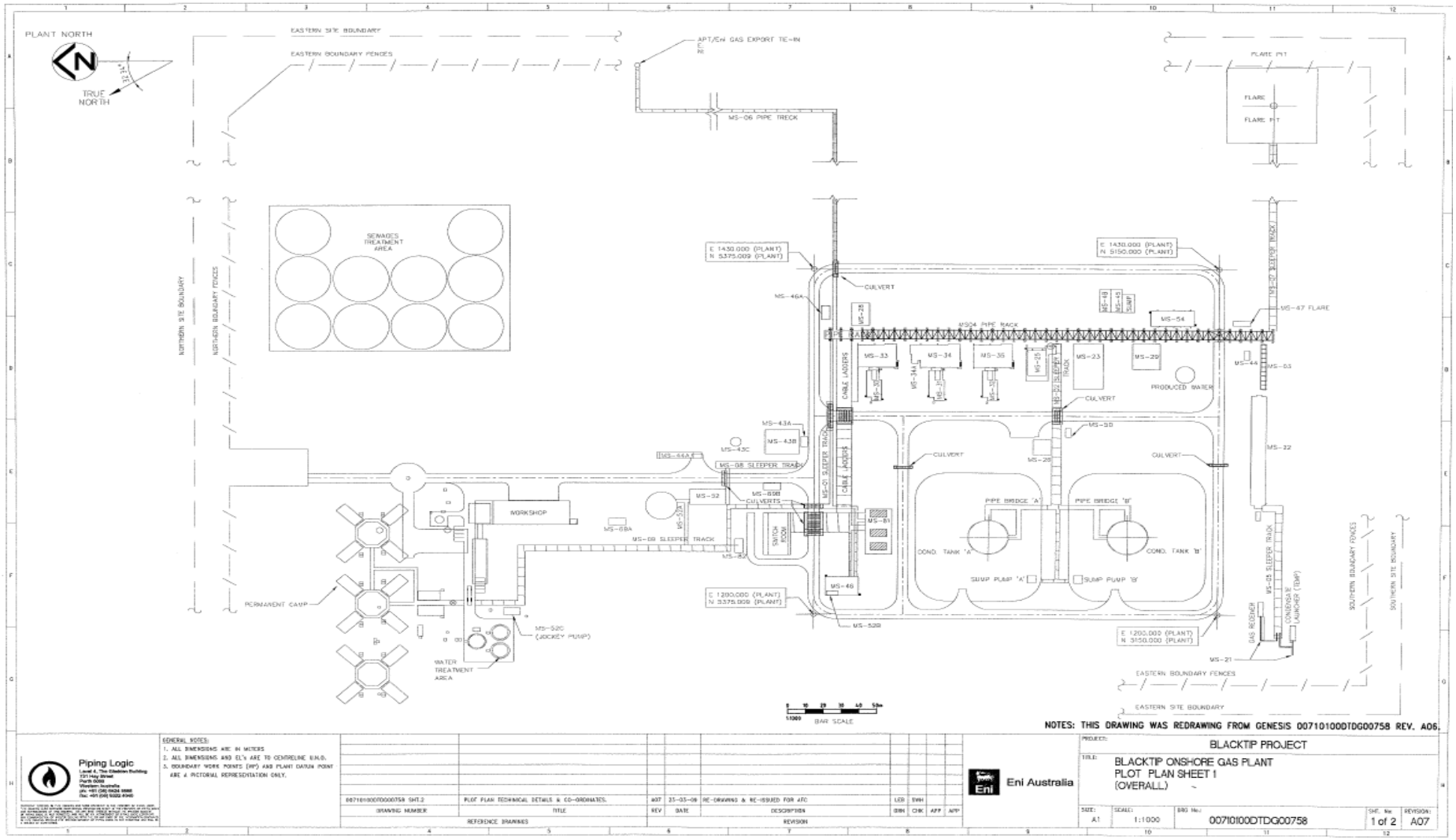


Figure 3.1: Blacktip YGP layout

3.3 Other facilities

Other key facilities on site include:

- Utilities system – including:
  - Power generation;
  - Compressed air system;
  - Potable water system;
  - Chemical injection;
  - Stormwater drainage;
  - Sewage treatment plant and effluent reuse; and
  - Firewater.
- Ancillary buildings – including:
  - Accommodation;
  - Laboratory, workshop and stores; and
  - Cyclone rated emergency response shelter.
- Hazardous chemicals storage; and
- Lighting, security and perimeter fencing.

4. PRODUCTION

4.1 Overview

The annual production is provided in Table 4.1.

Blacktip is licensed for a maximum scale of 1,055,300 tonnes of gas and 50,900 tonnes of condensate per annum.

Table 4.1: Overview of production

	2021	2022	2023
Annual gas production (KSCM)	881,400	543,814	390,558
Annual gas production (t)	673,000	415,240	297,976
Condensate production (t)	10,521	7,476	4,355
Total production (t)	683,521	422,716	302,331

Notes: Reporting period is from 1 January – 31 December

4.2 Condensate

One condensate offtake occurred on 29th November 2023. Volume was 27,511bbl.

4.3 Gas production

Total gas production in 2023 was 390 MSCM, a decrease from 2022.

4.4 Gas composition

The reservoir fluid properties and contaminants are shown in Table 4.2 and Table 4.3.

Table 4.2: Blacktip reservoir fluid properties

Component	Percentage
CO_2	0.62 mol%
N2	5.88 mol%
Methane	89.06 mol%
Ethane	2.82 mol%
Propane	1.00 mol%
Ibutane	0.12 mol%
Butane	0.23 mol%
Ipentane	0.06 mol%
Pentane	0.05 mol%
Hexanes	0.02 mol%
Heptanes	0.01 mol%
Octanes	0.02 mol%
Nonanes	0.03 mol%
Decanes	0.04 mol%
Undecanes	0.02 mol%
C_{12+}	0.01 mol%

Source: Ref. [3], [5]

Table 4.3: Contaminants in Blacktip Gas

Component	Maximum measured
H_2S	3.0 ppmv
Mercaptan	<0.5 ppmv
Mercury	0.2 µg/m³
Radon	222 Bq/m³
Argon	0.01 mol%
Oxygen	<0.01 mol%
Helium	0.06 mol%
Hydrogen	0.01 mol%
Benzene	0.002 mol%
Toluene	0.002 mol%
Ethyl Benzene	<0.001 mol%
Xylenes	0.001 mol%

Source: Ref. [3], [5]

5. MONITORING DISCHARGES TO WATER

5.1 Produced Water

Produced Formation Water (PFW) or Produced Water (PW) separated from the liquid stream is further processed in the PFW system to remove free and entrained oil prior to disposal at sea.

The key design functions of the PFW Treatment System are to:

- Handle a maximum flow rate of 9,400bwpd (1,500 m3/day);
- Reduce the oil in water concentration to below 25ppm; and
- Maintain pH of discharged water to between 6.5 and 8.5.

The main components include:

- Produced Water Degasser;
- Induced Gas Flotation (IGF) Units;
- Produced Water Break Tank; and
- CETCO unit.

The licence limit for OiW is 25mg/l, so a sodium hydroxide solution is added to remove the final hydrocarbon components to ensure specification. pH balance is returned by adding Citric Acid once the OiW readings have steadied below the limit. This information is gathered from site testing using the Horriba method to confirm suitability (within specification) prior to discharge.

Produced water discharge in this reporting period was 40.9ML.

Offshore produced water monitoring (in part for model validation) was conducted in June 2023.

Annual shellfish and sediment monitoring was conducted in November 2023 with the results consistent across sampling sites, with little variation between the control and monitoring sites, providing confidence that there are no adverse impacts from produced water discharge to the environment;

Table 5.1 presents the annual produced water discharges for the past three years.

Table 5.1: Produced water discharge annually.

	2021	2022	2023
Volume of PW discharged (m^3)	10,503	31,440	37,458
Number of discharge days	57	237	158

Notes: Reporting period is from 10 February 2023– 09 February 2024
Produced water volumes increased in 2023

5.1.1 Monitoring Objective

The objective of the Produced Water discharge monitoring program is to:

- Characterise the quality of the discharge stream; and
- Assess compliance with the limits and trigger values in the licence.

5.1.2 Monitoring Methods

Produced water is sampled and tested prior to discharge to ensure certain parameters are within the limits stipulated in the EPL. Samples are taken during discharge to ensure water quality remains within the licence limits. These samples are tested both in the site laboratory and/or transferred to the company's laboratory services provider.

EPL230-01 requires quarterly characterisation of PW. Sampling has been undertaken as per the sampling plan.

Samples are taken from PW-02. These samples are analysed for the parameters as specified in EPL230-01. The samples are generally taken on the Tuesday, which are stored appropriately, prior to transfer to the company's laboratory services provider Caleb Brett, a subsidiary of Intertek. The samples travel by charter flight from Wadeye to Darwin on a Wednesday morning. On arrival in Darwin, company logistics team moves the samples to Caleb Brett. Chemists at Caleb Brett distribute the samples to laboratories within their network. NATA accredited laboratories are used.

Routine and periodic produced water samples are collected by the process operators. The monitoring regime is further detailed in the document Environmental Monitoring Requirements [000036_DV_PR.HSE.1020.000_03].

5.1.3 Monitoring Results

In 2023, lower frequencies of PW discharge events occurred with increased discharge volumes compared to 2022. However, in late 2023 (from November) the volume of PW discharge reduced significantly and is expected to remain largely reduced throughout 2024 due to shutting of the water source.

The table outlining the results is available in the relevant Appendix.

Laboratory analysis indicates a sustained increase in Barium, Boron, Copper, Mercury, and Lead in the majority of data between November 2020 and early 2023. Levels of these metalloids showed some decrease in late 2023, though remain somewhat inconsistent in measurement. These are not parameters that trigger a breach in compliance. They are parameters that Eni has committed to monitor as per EPL230-01.

Increased levels of metals in identified in PW are likely due to the wells watering out, bringing greater concentrations of these metals to the surface. YGP does not yet have any metals removal process in the PWT system, so these metals are discharged to sea. Coagulant injection along with engineered equipment will be field trialled in 2024 to manage this.

Key trends identified during the reporting period are shown below.

Table 5.2: YGP Ba_T Trending Data

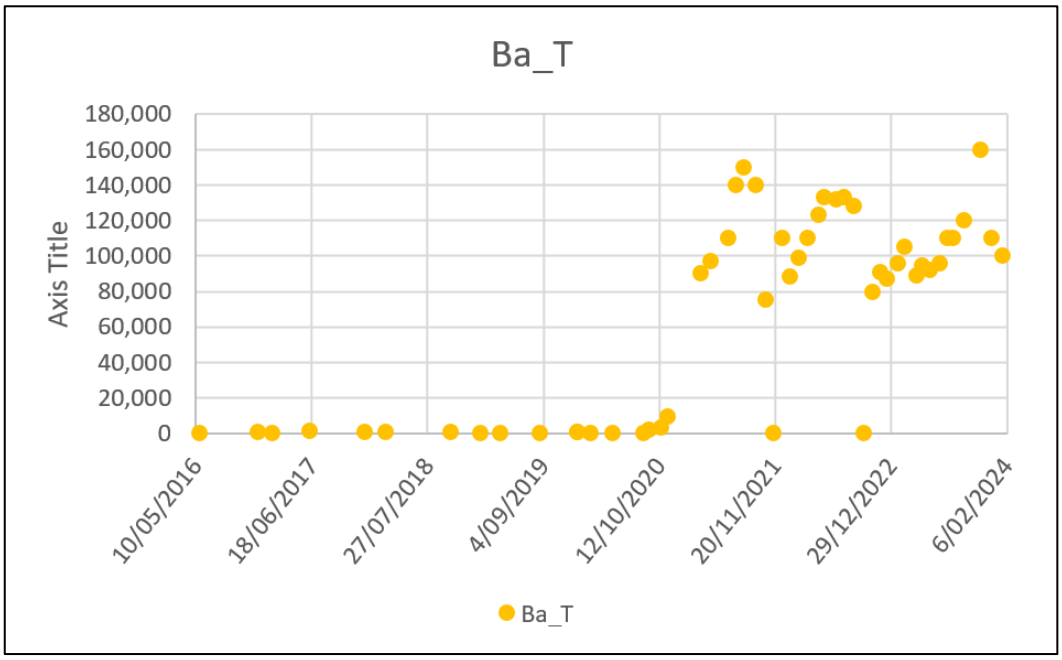
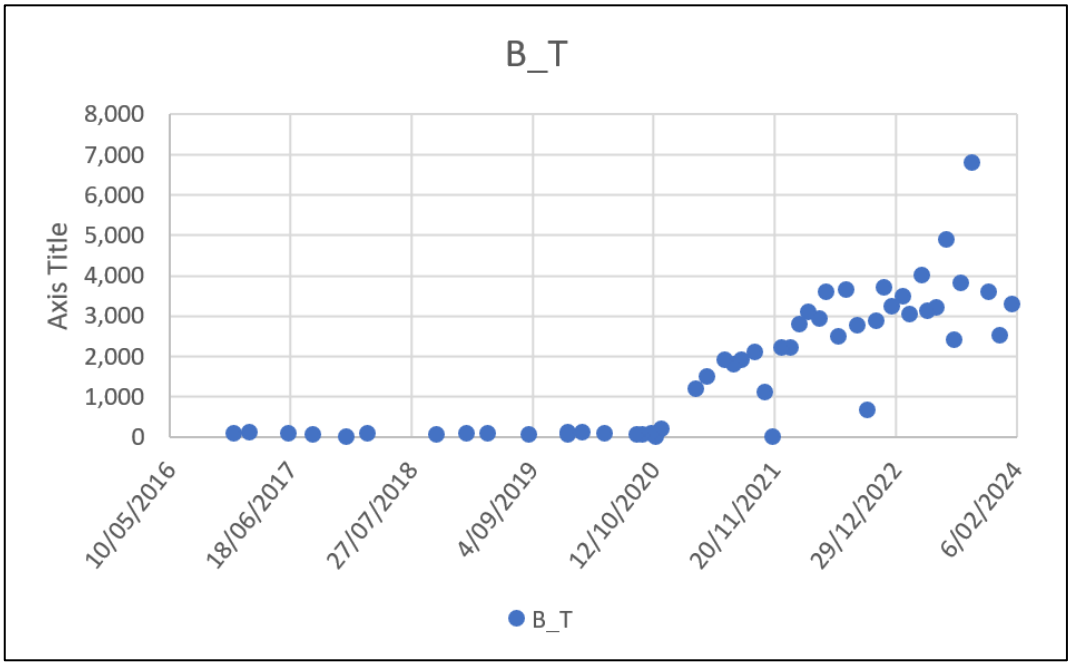
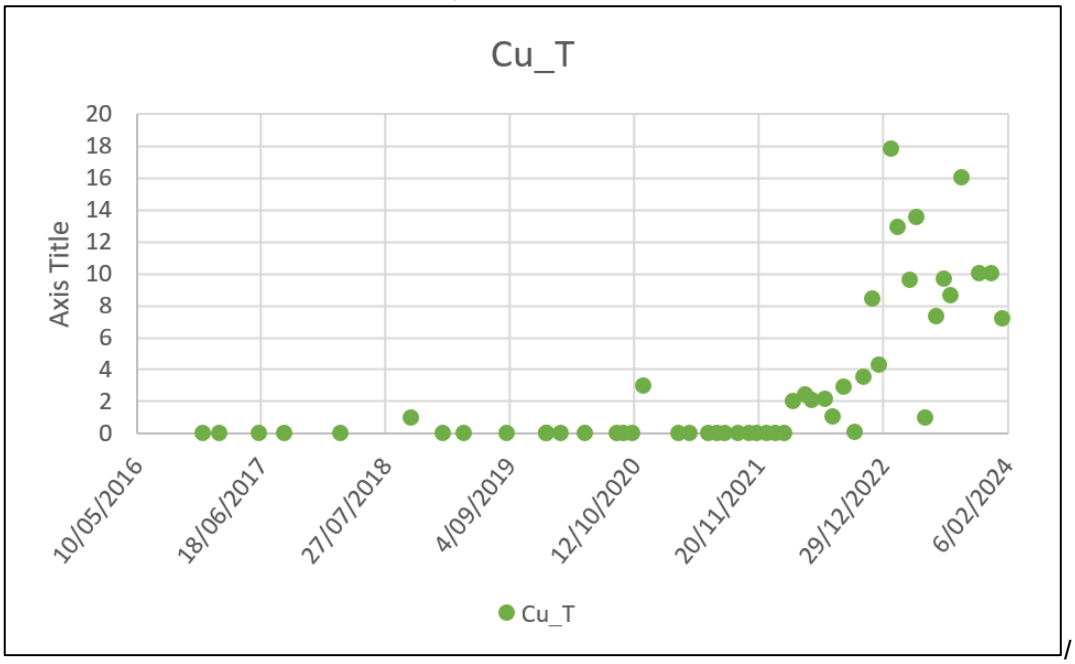


Table 5.3: YGP B_T Trending Data



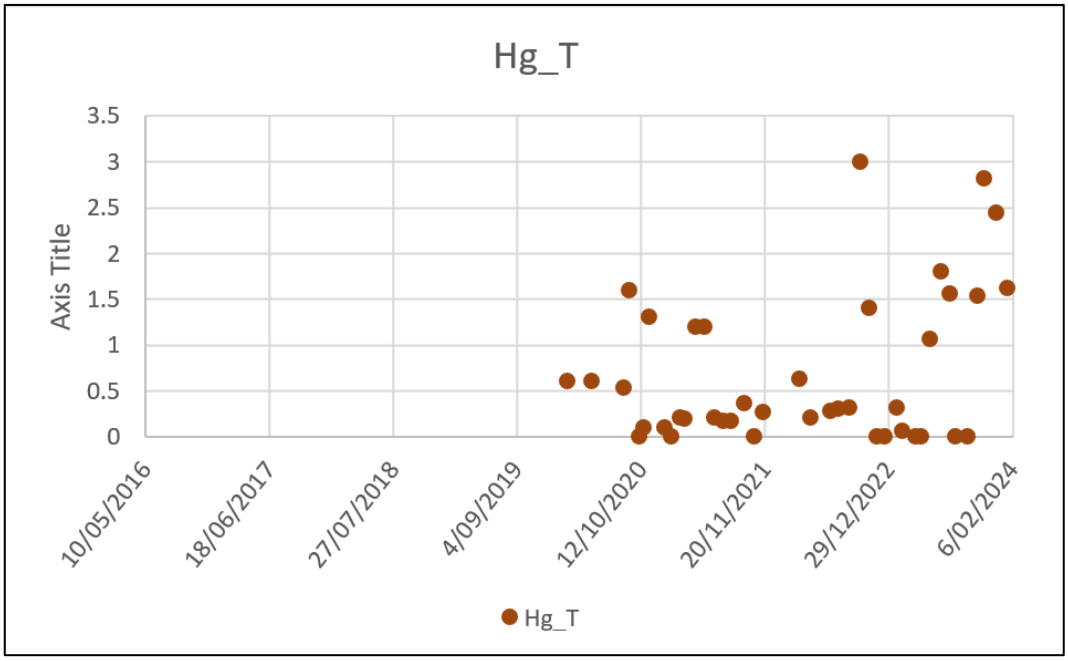
[µg/l]

Table 5.4: YGP Cu_T Trending Data



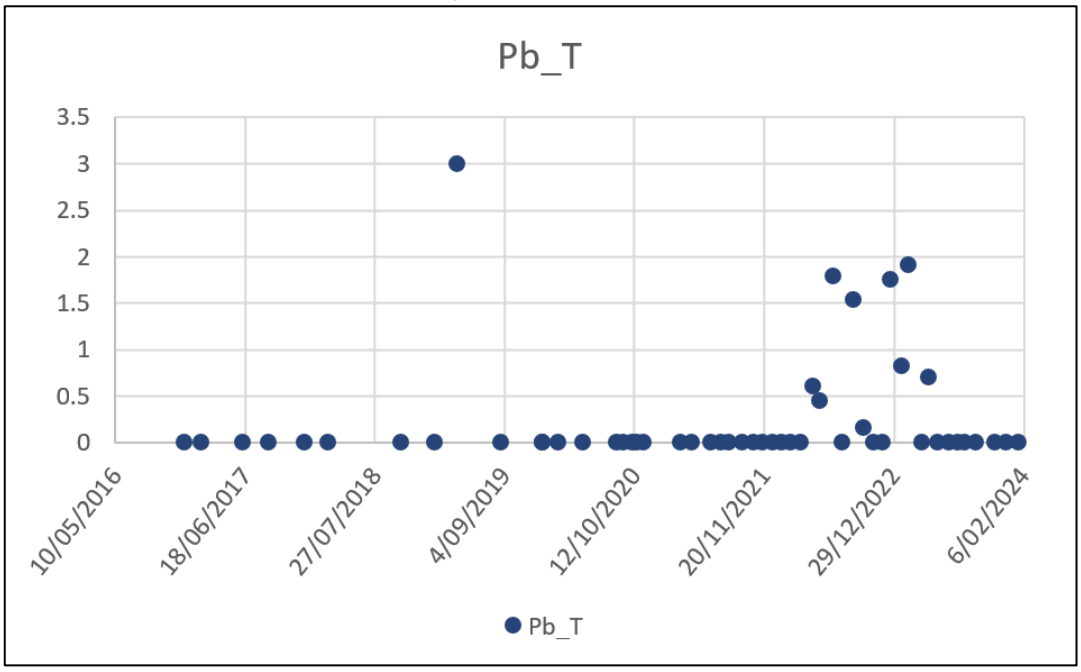
/l]

Table 5.5: YGP Hg_T Trending Data



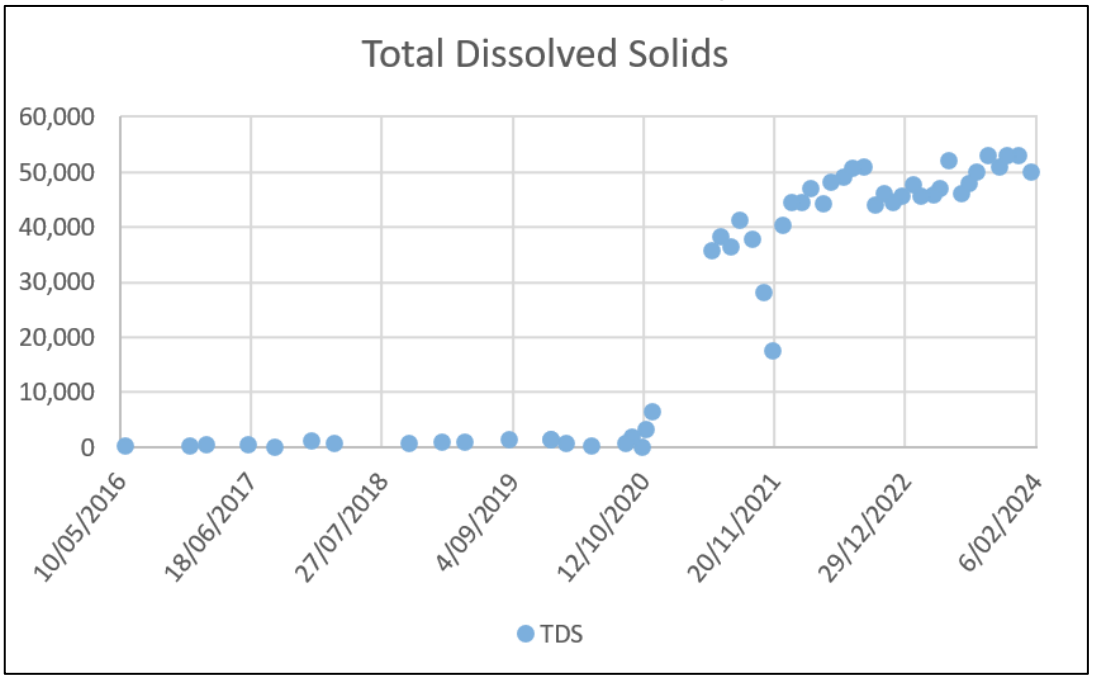
µg/l]

Table 5.6: YGP Pb_T Trending Data



[µg/l]

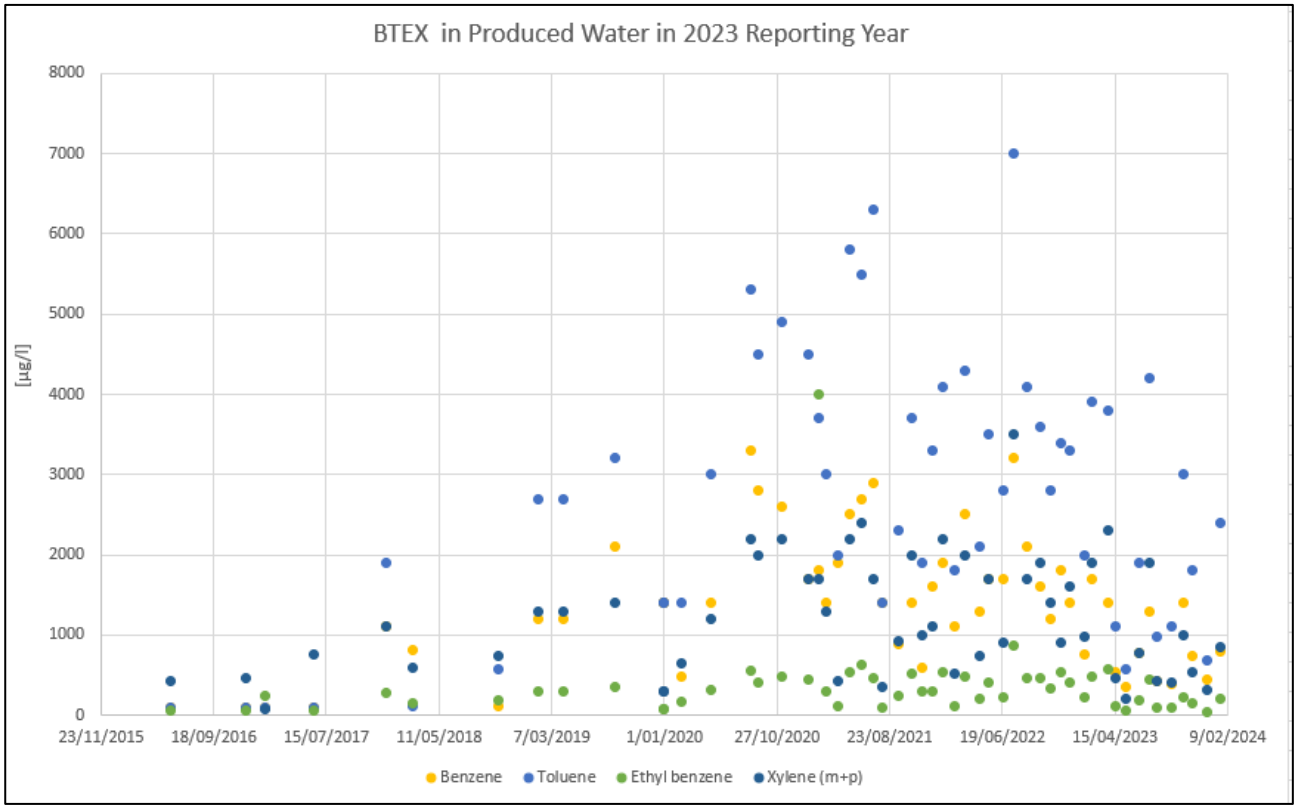
Table 5.7: YGP Total Dissolved Solids _ Trending Data



For hydrocarbon samples there has been a gradual increase in Benzene, Toluene, Ethyl benzene and Xylene (BTEX), since 2016. This is likely due to entrained hydrocarbon passing through the system. Furthermore, increased production of PW in recent years has limited residence time during treatment which affects BTEX removal.

The use of Nitrogen sparging and activated carbon filters to extract the entrained hydrocarbon in PW has been ongoing through 2023. The use of this correlates with a decrease in levels of BTEXs observable in late 2023 data. This indicates that Nitrogen sparging is showing signs of effectiveness in reducing BTEX levels in PW, despite ongoing exceedances. Hence, further refinements to this process will be ongoing throughout 2024 in order to keep BTEXs trending down towards EPL230-01 defined thresholds and trigger limits.

Table 5.8: BTEX in Produced Water Trending Data



The BTEX units are [µg/l].

5.1.4 Data Management and Quality Control

The quality assurance/quality control (QA/QC) procedures specific to the collection and analysis of samples from sample location include:

- NATA accredited analytical laboratories were used for all analysis or a test method managed under a NATA accredited quality management system;
- Laboratory designated sample holding times;
- Chain of custody forms completed and accompanied the samples; and
- Calibration of all field-testing equipment using standard method(s) was undertaken.

5.1.5 Annual Marine Monitoring

Eni has an annual commitment, set out in *Produced Water Management Plan* 000036_DV_EX.HSE.0381.000_A02, to undertake sediment and shellfish sampling in the vicinity of the produced water pipeline to monitor any impacts on sediment and biota.

Sediment and Shellfish Sampling was undertaken in November 2023 in accordance with the *Australian Government National Assessment Guidelines*. Sampling in 2023 was conducted late due to restricted beach access. Sampling is typically undertaken at the end of the wet season in May when shellfish are still relatively abundant.

2023 sampling demonstrated that all metal concentration in mangrove sediments were below the Australian and New Zealand default guideline values. All hydrocarbon concentration were below detection limits in mangrove sediment samples. Metal concentrations were all within the historical ranges across the various locations.

Overall, the results were consistent across sampling sites, with little variation between the control and monitoring sites, providing confidence that there are no adverse impacts from produced water discharge.

5.1.6 Produced water model validation

Eni has a commitment in the Produced Formation Water Plan (000036_DV_PR.HSE.1056.000_04) to validate the near field and far field produced water dispersion model. In working towards this, Eni is revising the Produced Formation Water Plan (000036_DV_PR.HSE.1056.000_04) with finalisation expected in 2024.

Offshore monitoring at the produced water outfall was undertaken in November 2020, for the purposes of validating the produced water dispersion model in accordance with the Produced Formation Water Plan. The study report was delivered on the 25th of March 2021. The assessment concluded that within the proposed 50m mixing zone, no laboratory parameters exceeded the ANZG (2018) Marine water 99% toxicant DGVs.

This report was submitted to the NT EPA on 30th April 2021 to support the licence amendment of Eni to increase the allowable discharge concentration of BTEX, Zn, and Mn parameters in the Produced Water Discharge stream.

Following up on the above-mentioned Study Report, Thamarrurr Rangers also participated in an Eni endorsed AIMS water outfall sampling training programme to support future sampling and monitoring of the mixing zone. A targeted campaign of PW outfall data was collected during the monitoring training in June 2023 which demonstrated similar results to the November 2020 Study Report, further validating harm to the environment is not evident.

5.1.7 Discussion and Interpretation of Results

In respect to wells management, in late 2020, a new water layer was broken into. This brought additional produced water inclusive of metals to the surface and to the YGP. This was later capped to reduce water flow rates in early 2024.

BTEX is light entrained hydrocarbon. These levels have exceeded parameters for TEX for several years, so appear unlinked to the new water source in the formation.

5.1.8 Conclusions and Proposed Actions

To align the quality of discharged PFW with specifications, Company has developed a PFW Project roadmap towards EPL230-01.

As part of PFW Project, Nitrogen sparging has been used in the Produced Water Treatment tank to remove the light hydrocarbons, which has showed some effectiveness and will be further refined throughout 2024.

The Project has also trialled and implemented inline oil separation using activated carbon filters to further remove entrained hydrocarbons.

Additionally, trials for the use of a coagulant injection system utilising engineered equipment to reducing metals in PW will be carried out in Q2 2024.

It is acknowledged that due to dilution in the mixing zone to contaminant concentrations below ANZG Default Guideline Values (DVG), the risk of negative environmental receptor impact is deemed low.

6. MONITORING DISCHARGES TO LAND

6.1 Wastewater disposal

Domestic wastewater, including wastewater originating from showers, wash basins, toilet facilities, laundries, and kitchens, is treated by the Wastewater Treatment Plant (WWTP). The WWTP is an ABACO Jacana Sequencing Batch Reactor (SBR). The SBR includes primary treatment by settlement and secondary treatment by activated sludge. Treated effluent is discharged through an irrigation system to the designated area shown. The irrigation system has a flow rate capacity of 3.5m3 /hr and consists of 10 sprinklers, each with a 40m radius.

Wastewater generated at Blacktip YGP is treated in an ABCO Water System 150 EP. Effluent is reused through an irrigation system to land, and a total of 1.8ML was discharged over the reporting period.

Table 6.1: Treated wastewater effluent reuse

	2021	2022	2023
Effluent reuse (ML)	1.7	1.4	1.8

Notes:
Reporting period is from 1 February to 31 January.

In accordance with the EPL, treated discharged wastewater is sampled and analysed for constituents monthly by an external laboratory to verify compliance against the contaminant limits. The results are presented in the relevant Appendix.

Volumetric flowrates of wastewater are up slightly from 2022 discharges.

A new effluent discharge flowmeter was installed in March 2023 due to lightning strike impacting the old meter.

Improvements to chorine dosing methods to reduce levels of E.coli as well as aeration methods to minimise BOD have been made to the WWTP in 2023.

6.1.1 Monitoring Objective

Wastewater monitoring includes:

- Routine testing on site prior to discharge; and
- Periodic (monthly, quarterly, or annually) monitoring of discharge water for detailed chemical analysis.

Routine sampling and testing prior to discharge allow water quality to be assessed to determine whether it meets the EPL limits for discharge. The tests are typically carried out on site in the site laboratory using portable bench top instruments such as the Horiba and PC700 and are described in the Blacktip Operations Water Sampling Procedure 000036_DV_PR.HSE.1013.000.

Periodic monitoring of discharge water is undertaken to monitor the chemical composition of the wastewater stream and assess water quality across a full suite of parameters. Samples are sent to an external laboratory for analysis of chemical composition.

Sewage wastewater samples are collected by the Process Operators. Sewage wastewater is treated by the Wastewater Treatment Plan (WWTP) and discharge to a nearby irrigation spray field (authorised discharge point WW-01).

6.1.2 Monitoring Methods

Samples are taken from sample point WW-02. These samples are analysed for the parameters as specified in EPL230-01. The samples are taken on the Tuesday and are stored appropriately. Samples are transferred to Darwin and Chain of Custody transferred to company's laboratory services provider Caleb Brett, a subsidiary of Intertek. The samples travel by charter flight from Wadeye to Darwin on a Wednesday morning. On arrival in Darwin, company logistics team moves the samples to Caleb Brett. Chemists at Caleb Brett distribute the samples to laboratories within their network. NATA accredited laboratories are used where required.

In 2023, following a recommendation of the S48 Audit and in an attempt to improve wastewater testing quality, Company engaged external Technicians to conduct water sampling for a period. This transferred responsibility from in house to an external provider. However, due to longer transfer times and exceedances in sample holding times, Company reverted back to the original sampling methodology. This was caused by restrictions on logistics associated with set charter flight schedules.

Routine and periodic water samples are collected by the process operators.

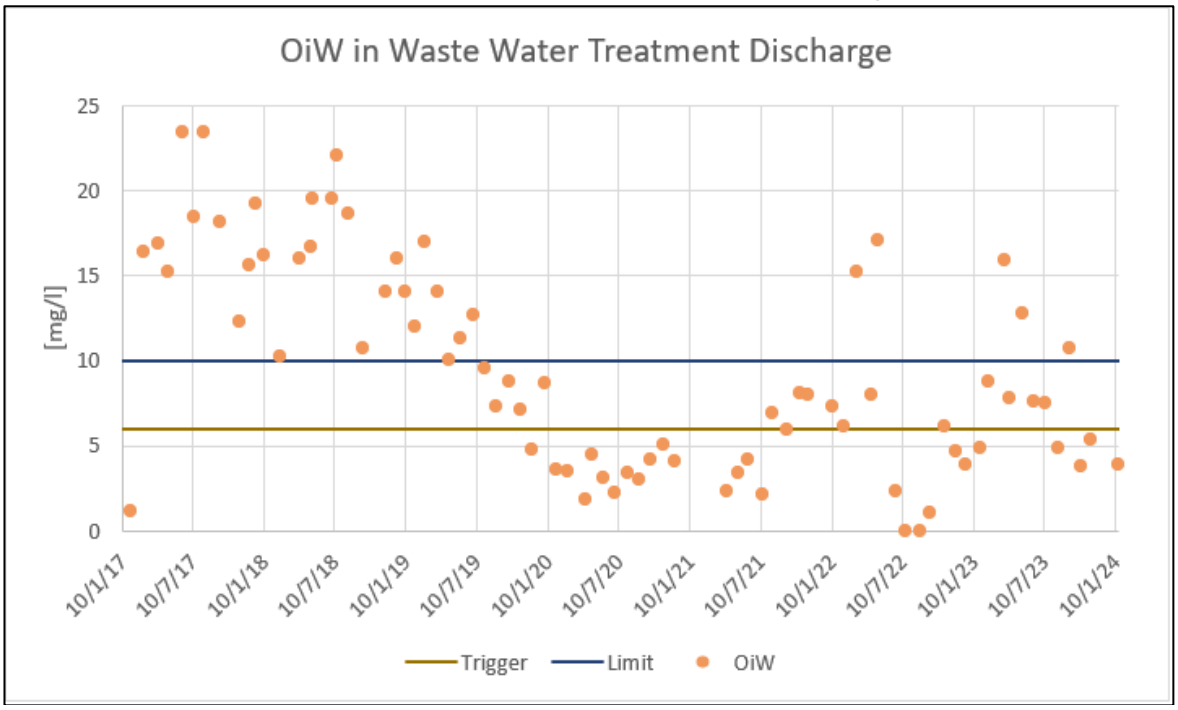
The monitoring regime is further detailed in the document Environmental Monitoring Requirements [000036_DV_PR.HSE.1020.000_03].

6.1.3 Monitoring Results

The table outlining the results is available in the relevant Appendix.

Graphs indicating trending according to parameters with EPL limitations and parameters to be monitored, are presented below.

Table 6.2: YGP Treated wastewater effluent reuse Trending Data



Higher values of OiW have historically been associated with inappropriate use of the grease trap in the kitchen. Awareness and discipline on this issue is maintained on site to ensure kitchen hands and chefs dispose the waste oil into the grease trap, which is then transported to Darwin for disposal. These initiatives have been well received and implemented by the new catering contractors (TCLH) engaged in Q3 2023.

Exceedances of OiW limits in wastewater occurred in March, April and August 2023. Company will continue to communicate importance of proper waste disposal to staff and maintain acceptable levels of OiW in wastewater as observable in late 2023 data.

Table 6.3: YGP pH and Range Trending Data

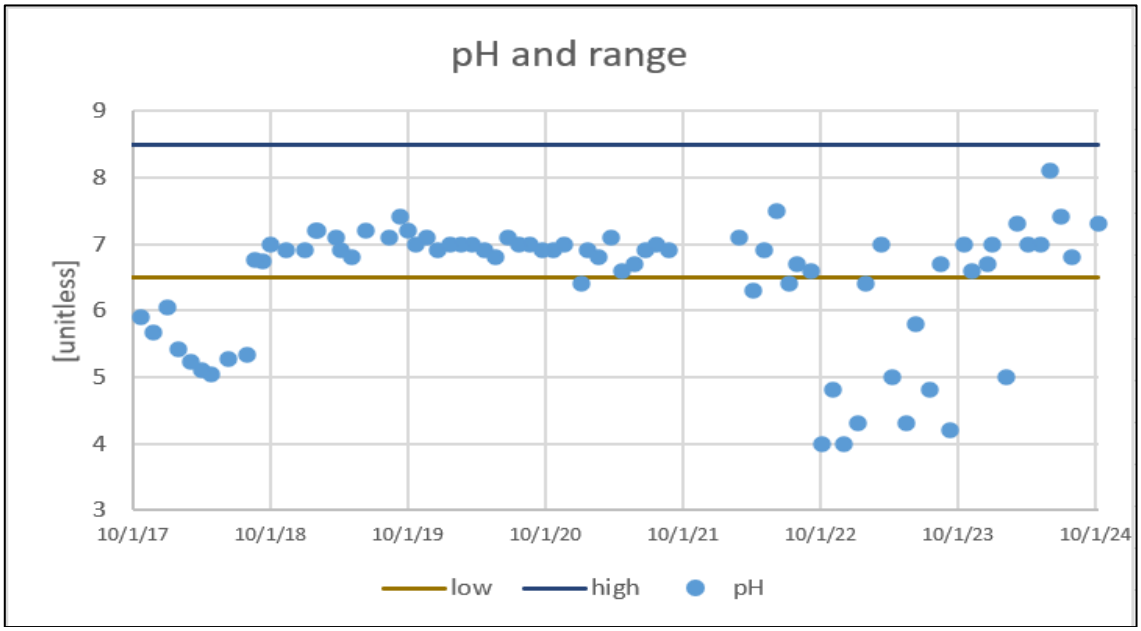


Table 6.4: YGP E.coli and licence limits Trending Data

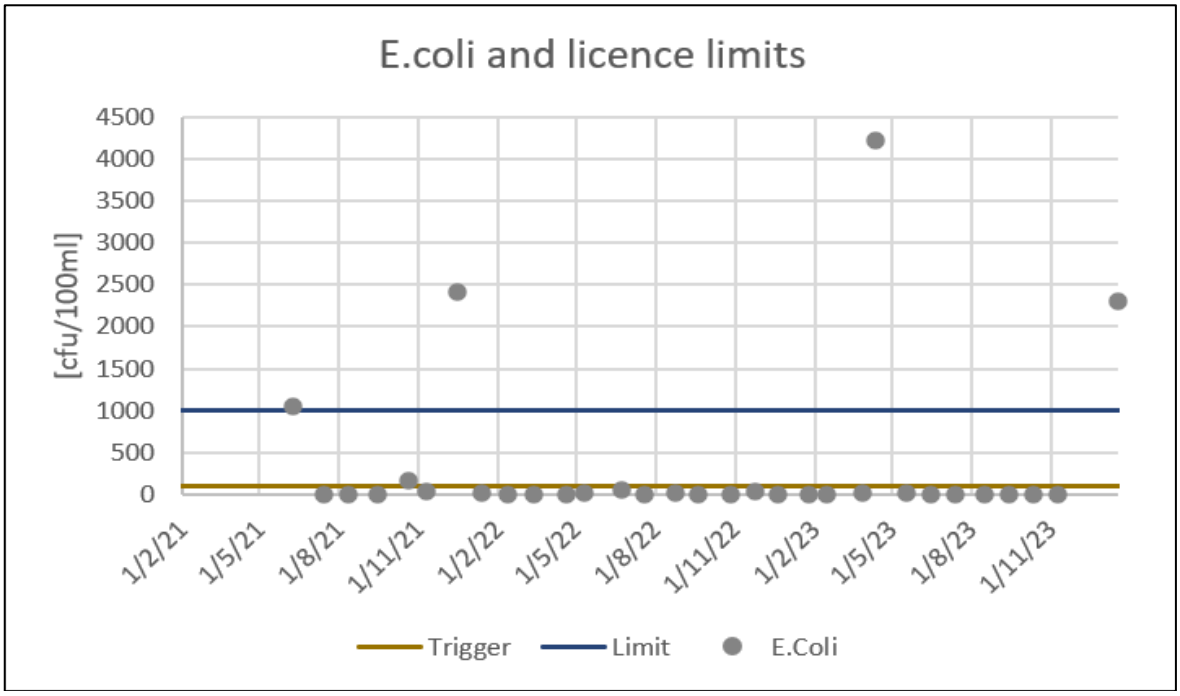


Table 6.5: YGP BOD and licence limits Trending Data

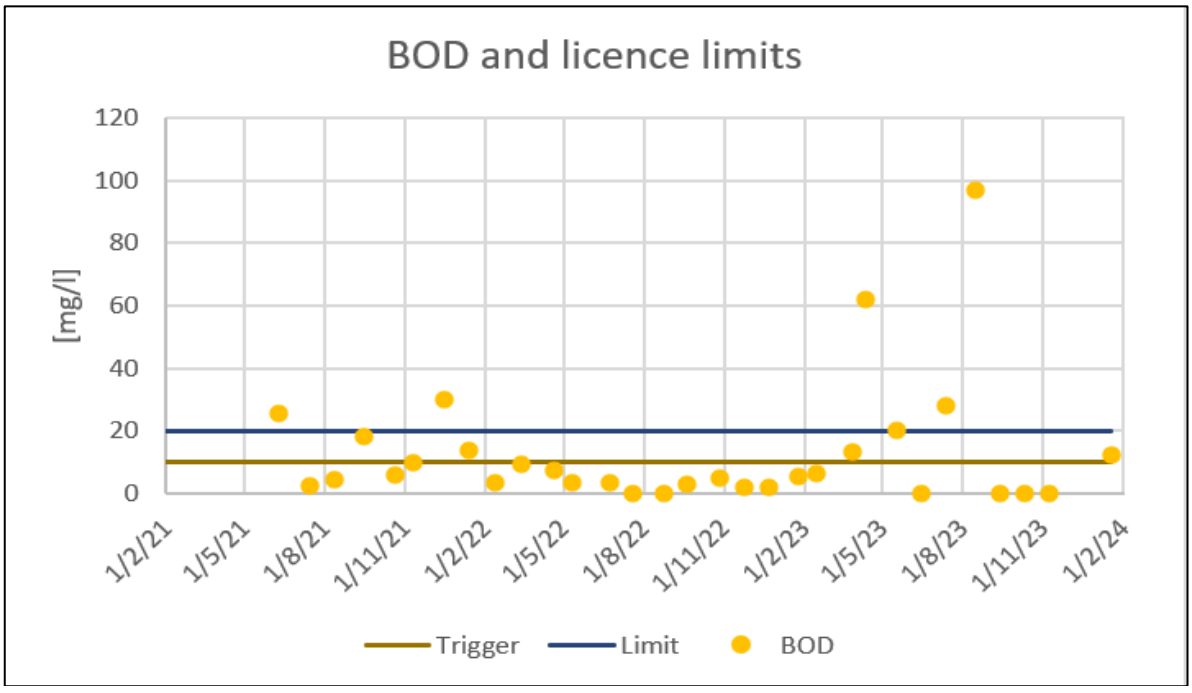


Table 6.6: YGP TSS and licence ranges Trending Data

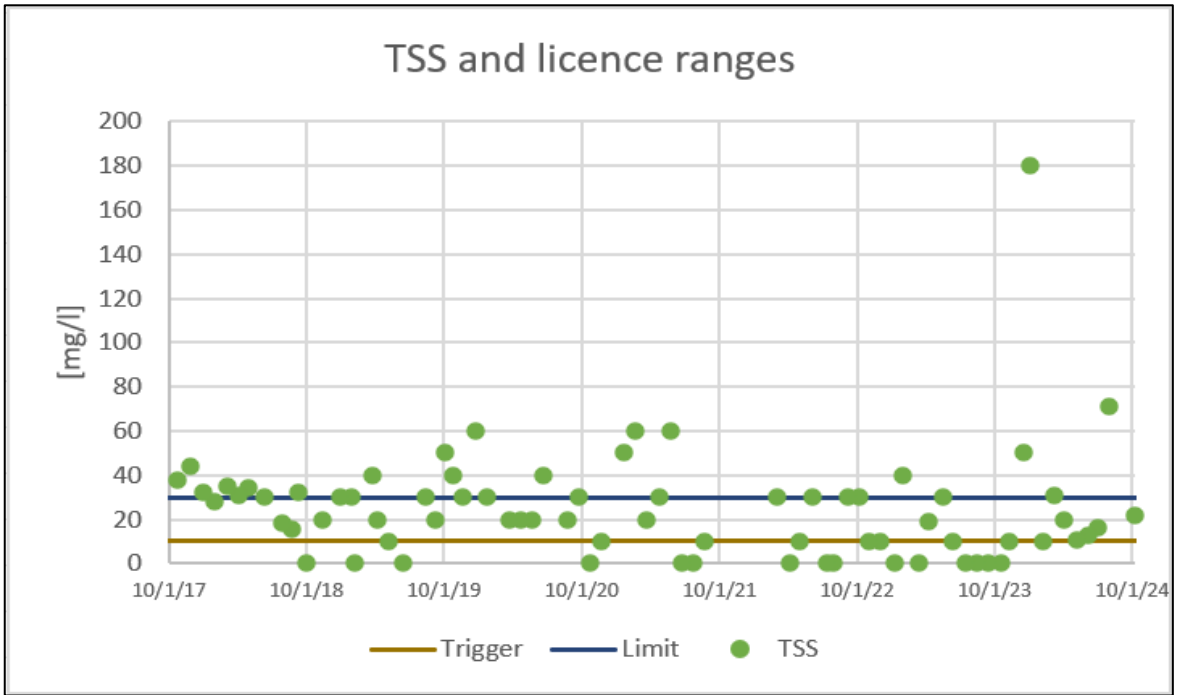


Table 6.7: YGP Ammoniacal Nitrogen Trending Data

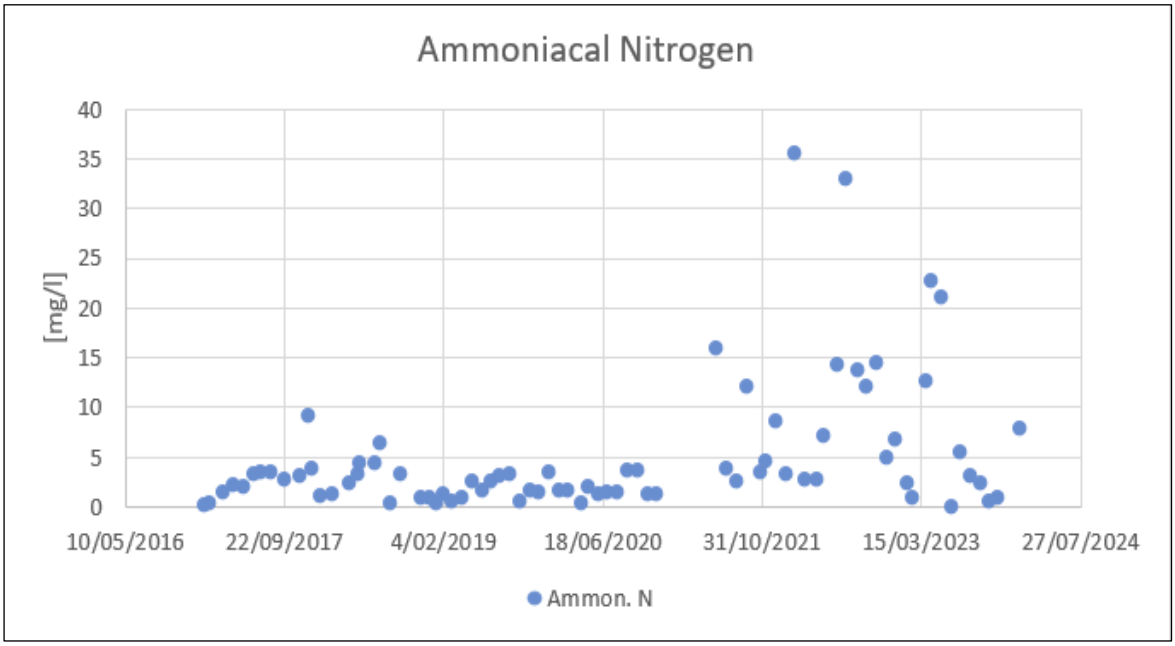


Table 6.8: YGP Electricity Conductivity Trending Data

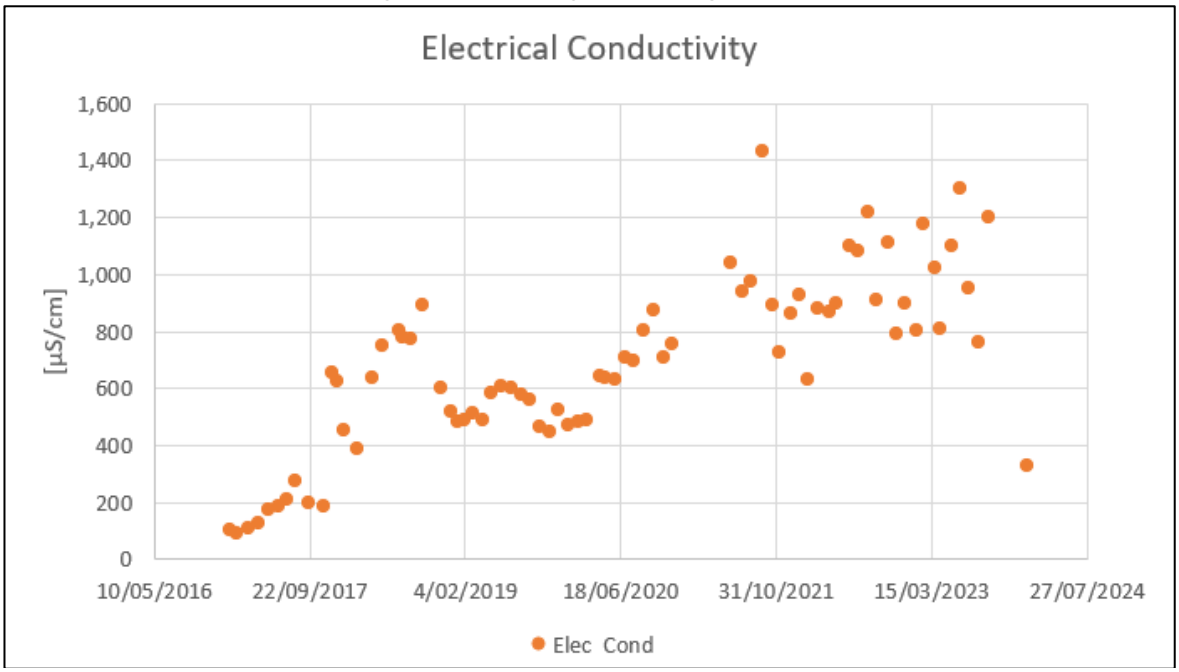
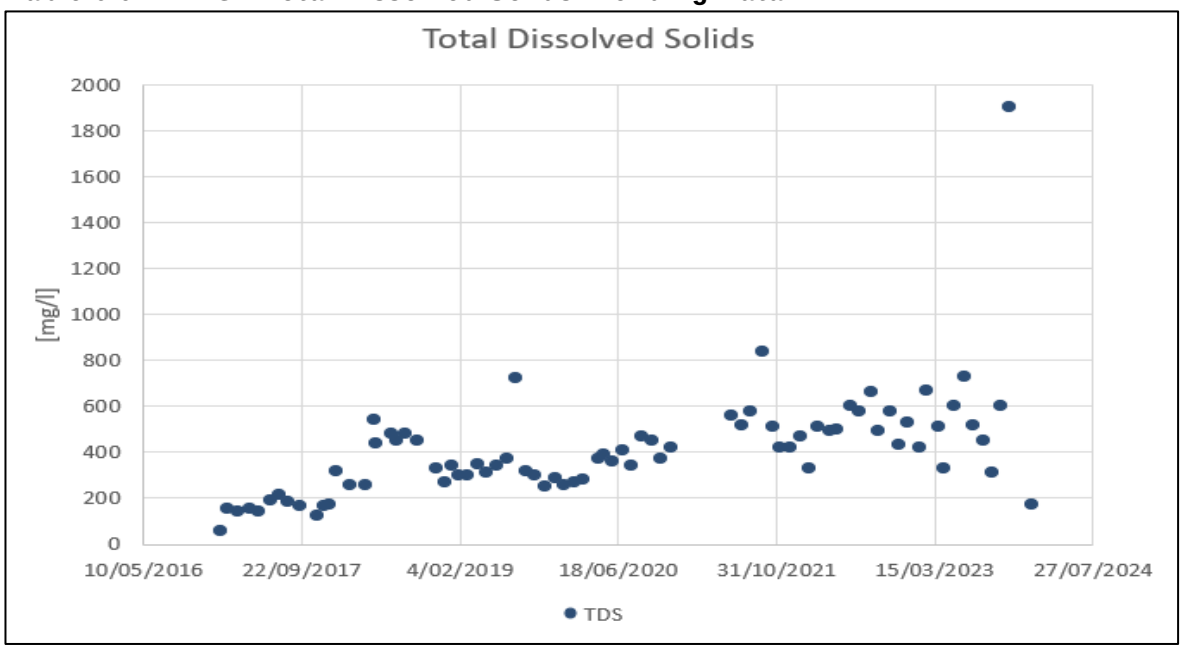


Table 6.9: YGP Total Dissolved Solids Trending Data



6.1.4 Data Management and Quality Control

Samples are obtained as per the Sampling Plan.

Single samples are taken and distributed to participating laboratories.

Duplicates, Triplicates, Blanks and Controls are not used as the number of bottles required to achieve this level of QA/QC is unrealistic knowing the logistics challenges at YGP.

6.1.5 Discussion and Interpretation of Results

In May 2023, wastewater pH levels fell below pH6.5 briefly before returning to acceptable limits.

Aeration pump trials have initiated the reduction of BOD levels in treated wastewater.

In November an exceedance of acceptable limits for TSS occurred alongside higher levels of TDS. This spike in TSS can be attributed to the carry-over of solids during Aeration pump trials.

In April 2023 and January 2024 levels off E.coli exceeded licence conditions. Since these occurrences, an automatic chlorine dosing system has been installed and brought online.

Levels of TDS and electrical conductivity have been reduced in late 2023/ early 2024.

6.1.6 Conclusions and Proposed Actions

The wastewater treatment plant is considered over-sized for its throughput. It is designed for a 120-person camp, and generally is only processing the waste of 20 persons. This brings with it operational challenges that need to be managed.

In addition to recent chlorine dosing and aeration improvements, Company are looking to further options for performance improvements to the wastewater treatment system. Monitoring of data and implementation of recommendations from recent Audits and Performance Reviews of the wastewater treatment plant will continue to inform any such refinements.

6.2 Stormwater disposal

The open drains on the YGP are designed to collect stormwater, washdown water, fire test water and any accidental spills from equipment. During the wet season, a large volume of water will enter the drains. The main contaminant of concern in the equipment bund will be residual hydrocarbons related to equipment leaks or maintenance. The flow is highly variable and minimal in the dry season and up to the design capacity of 130m3 /hr during the wet season. The plant drains are split into two separate systems:

- Hazardous; and
- Non-hazardous.

Stormwater discharge to the environment includes cooling water from the fire pump testing and stormwater collected from the process skids. Fire pump cooling water is potable water used in a tubular design heat exchanger, where the other medium is coolant. The cooling water does not come into direct contact with the coolant or any other contamination sources and is discharged directly from the utilities area run off sump (monitoring point SW-01) or via the Hazardous open drains pit (monitoring point SW-03) if further treatment is required. This source of stormwater was diverted from SW-02 in 2023 to allow treatment prior to discharge.

Process skid stormwater is collected in the Open Drain Sump (ODS) for treatment and sampling prior to manual discharge to grade at SW-03. The ODS typically remains closed for much of the dry season and is only opened to grade when rainfall increases during the wet season.

6.2.1 Monitoring Objective

To determine the contaminants in the storm-water run-off stream before being discharged to grade.

There is no flow meter on this discharge, the fluids flow to grade after a sample is taken and analysed.

6.2.2 Monitoring Methods

Treated storm water samples are collected by the process operators.

Treated storm water includes runoff from the utilities area (authorised discharge point SW-01) and stormwater runoff from the Open Drains System (authorised discharge point SW-03).

6.2.3 Monitoring Results

Results are provided in relevant Appendices.

The following trends are available.

Table 6.10: YGP SW-03 pH and licence limits Trending Data (2017 – 2024)

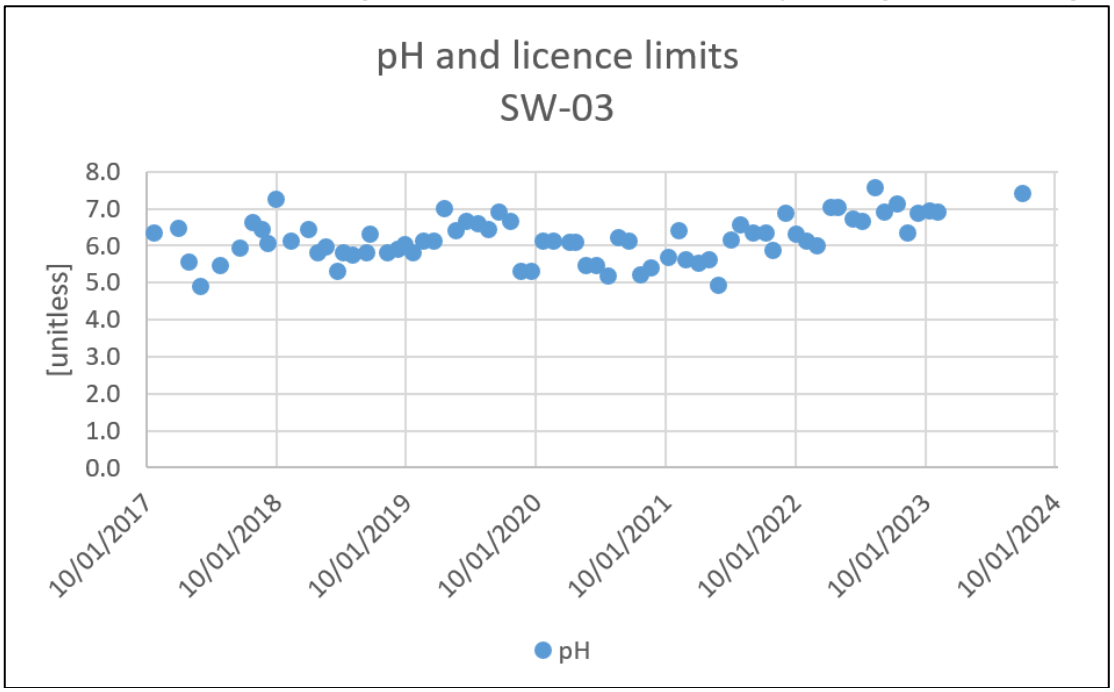


Table 6.11: YGP SW-03 Electrical Conductivity Trending Data

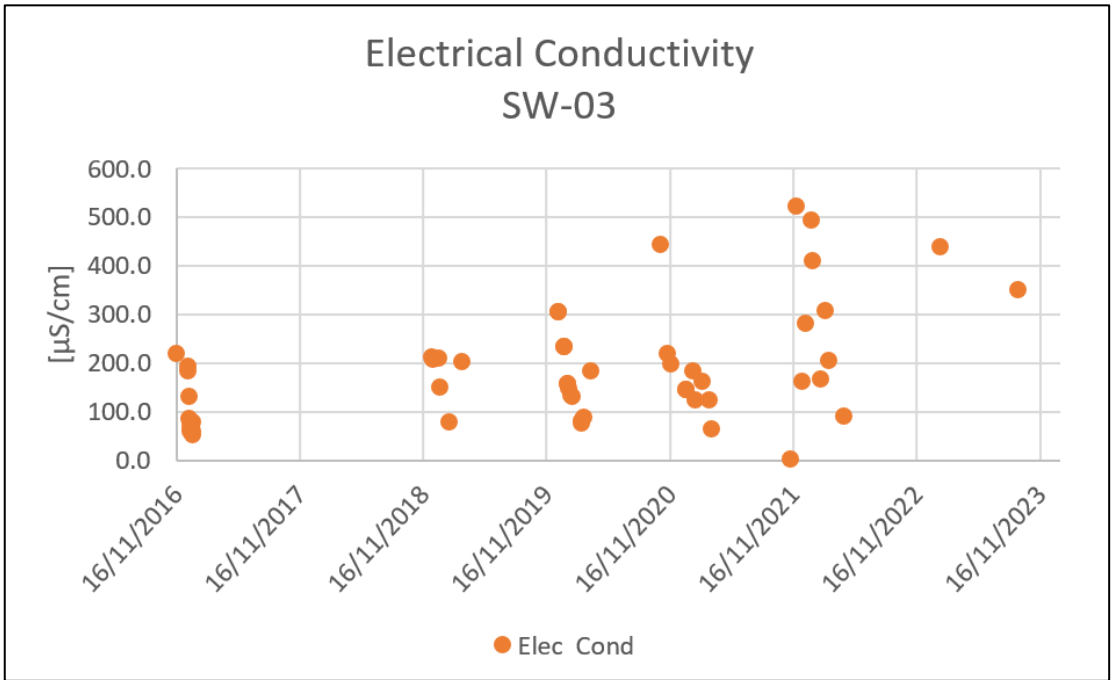
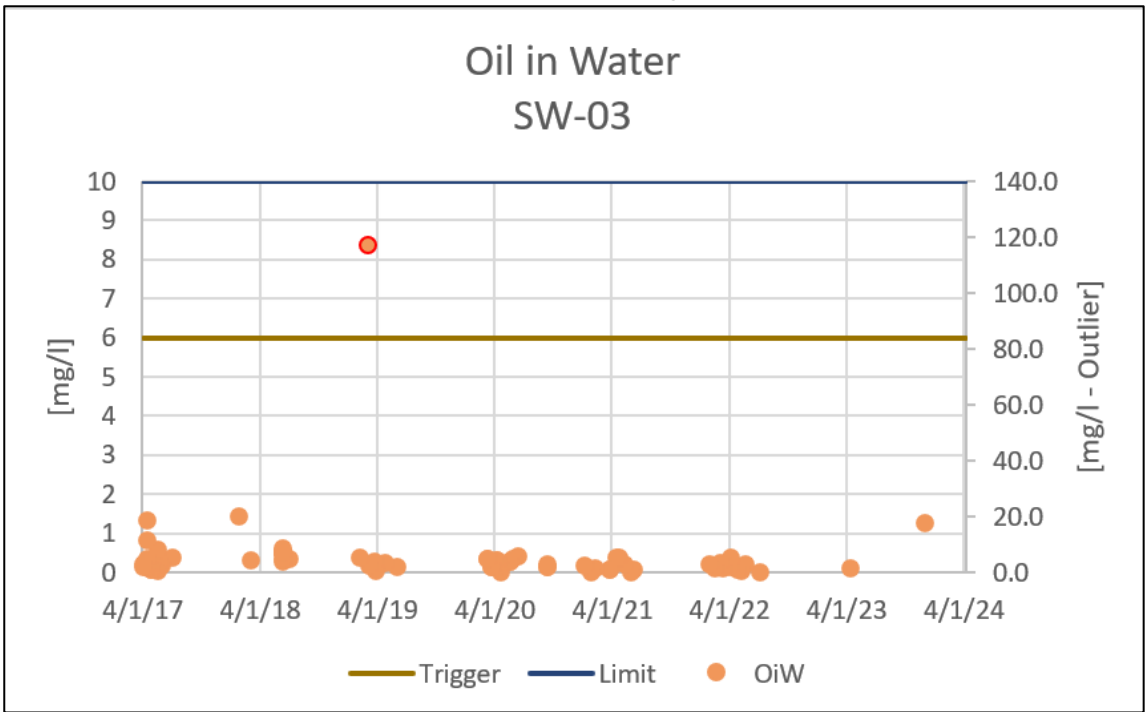


Table 6.12: YGP SW-03 Oil in Water Trending Data



6.2.4 Data Management and Quality Control

As explained in earlier sections, there are logistical challenges with meeting required QA/QC expectations in sampling methods due to the remoteness of the site.

6.2.5 Discussion and Interpretation of Results

The conversion of data from the previous reporting structure to the new format requested by NT EPA to communicate information in the latest structure (April 2022) is still ongoing. For storm water the historical data has not been brought up to present requirements, due to the significant extra work required to complete the transformation.

Three stormwater sampling events including lab analysis were conducted at monitoring point SW-01 over the reporting period. These were conducted in February and September 2023 as well as in January 2024. Results for these are in the appendices of this report.

Site testing of discharge points at the utilities area (authorised discharge point SW-01) and stormwater runoff from the Open Drains System (authorised discharge point SW-03) was also conducted throughout the year (see appendices).

Eni is continuing to collate historical stormwater data for the last two years.

6.2.6 Conclusions and Proposed Actions

In 2024 Company will continue to monitor OiW results in site and lab testing to prevent further exceedances. Company will also explore options for stormwater discharge outlets to be fitted with flow meters in order to improve monitoring data.

7. MONITORING DISCHARGES TO AIR

Air emission monitoring is performed by the external laboratory services provider.

Most air emissions emanating from the YGP are from the following key sources:

- Flares;
- Gas turbine compressors;
- Gas engine generators; and
- Emergency diesel generator.

Fuel usage for the compressors and gas engines is monitored continuously, as are gas quantities flared. Table 7.1 lists the flow meters used for measuring the various gas streams.

Table 7.1: Gas flow meters

Emission Source	Gas Flow Meter	Reference Number
Turbine Compressor	Compressor A Compressor B Compressor C	420.1 FIT 161 420.1 FIT 261 420.1 FIT 361
Engine Generators	LP Fuel Gas	420.1 FIT 004
Flare	HP Flare	230.1 FIT 008
	LP Flare	230.1 FIT 002
	Fuel Gas Distribution	420.1 FIT 007

Total greenhouse gas emissions from Yelcherr Gas Plant calculated in the latest NGER reporting period were 28,550 tCO_2-e (Ref. [2]).

7.1.1 Monitoring Objective

The objective of this monitoring objective is to determine the contaminants in the exhaust stream of the compression units.

There is a flow meter on this fuel gas input. Multiplication with flow rate and concentration from the Ektimo analysis provide the final contaminant flow.

Ektimo is brought to site twice annually. For the visits they obtain the following information:

Air Emissions Monitoring Programme

Atmospheric Emission Points		Monitoring location height	Parameter						
Emission point code	Description		CO	CO_2	CH_4	NOx	SO_2	Solid particles	VOC
A01	High Pressure Flare	-	NR	NR	NR	NR	NR	NR	NR
A02	Low Pressure Flare	-	NR	NR	NR	NR	NR	NR	NR
A03	Gas Turbine Compressor A	13 m	B	A	A	B	A	A	B
A04	Gas Turbine Compressor B	13 m							
A05	Gas Turbine Compressor C	13 m							
A06	Gas Engine Generator A	8 m	B	A	A	B	A	A	B
A07	Gas Engine Generator B	8 m							
A08	Gas Engine Generator C	8 m							
A09	Emergency Diesel Generator	-	NR	NR	NR	NR	NR	NR	NR

A = Annually; B = biannually (i.e. every 6 months); NR = Not Required;

The NGERS reporting approach has been used in this report.

NGERS and NPI reporting data was externally validated for correctness in 2023.

7.1.2 Monitoring Methods

NGERS and NPI reports form the basis of the analysis.

Ektimo investigations and reports ensure that the discharge concentration of contaminants is known.

Fuel and gas flow must also be measured and recorded to determine the overall pollutant mass loading and ensure mass limits are not exceeded. Fuel and gas flow are measured by flow meters, shown below. Pollutant loads are calculated and reported annually under the National Greenhouse and Energy Reporting Scheme (NGERS) and the National Pollutant Inventory (NPI) reporting scheme.

Frequency	Sample Location	Monitoring Methodology	Parameter	Analysis	Concentration Limit
Adhoc	A01 A02	Visual monitoring for visible smoke using a Ringelmann chart	Smoke	Visual observation by site personnel	No visible emission other than for a total period of no more than 5 minutes in any 2 hours
Bi-annual	A03 A04 A05 A06 A07 A08	A sample must be collected by a qualified technician and sent to an external laboratory for analysis	CO*	External laboratory	100-1600 mg/m
			NOX*		350-2000 mg/m
			VOC		40 mg/m
Annual			C02	External laboratory analysis	
			CH4		
			SO2		100 mg/m
			Solid Particles		
Dry, 273K, 101.3 kPa, 15% O2 or at manufacturers specified level ARingelmann chart is provided in Appendix D Source: EPL 230-01, Attachment 4 Air Emission Monitoring programme					

Table above taken from Blacktip Operations Environmental Monitoring Requirements [000036_DV_PR.HSE.1020.000].

7.1.3 Monitoring Results

Atmospheric parameters in the licence have been on specification through 2023/2024.

7.1.4 Data Management and Quality Control

Intertek managed the Ektimo contract during the reporting period and QA/QC checks are available on request.

7.1.5 Discussion and Interpretation of Results

An assumed LP flare flowrate has been estimated and used in the cumulative flaring figure. The meter involved was returned to service on the 24th of April 2023.

Exhaust emissions from the above equipment contains contaminants, which at high levels can contribute to air pollution including greenhouse emissions and smog.

The YGP operates a high pressure (HP) and low pressure (LP) ground flare system. These are in a 'pit' at the southeast corner of the plant. The locations of the solar gas turbine compressors and the gas engine generator packages are also shown in Figure 3.8. The compressors operate on a 1 x 100% basis and generators on a 2 x 100% basis.

7.2 Fuel gas consumption

The two main consumers of high pressure (HP) and low pressure (LP) fuel gas are the gas turbine compressors and power generators. The volume of gas consumed as fuel during the reporting period is summarised in Table 7.2.

Table 7.2: Gas consumption at YGP

	2021	2022	2023
Daily fuel gas consumption (KSCM)	76.9	55.8	41.3
Total annual fuel gas consumption (MSCM)	28.1	20.3	15.1
Emissions (tCO_2-e)	56,800	46,618	32,228

Notes:
Reporting period is from 1 January – 31 December
Emissions number for 2022 taken from Eni's internal GHG recording program, SHERPA.

7.3 Flaring

The annual volume of gas flared from the past three years is summarised in Table 7.3.

Table 7.3: Gas flared at YGP

	2021	2022	2023
Daily volume of gas flared (KSCM/d)	6.98	6.2	8.5
Total volume of gas flared (KSCM)	2,549	2,262	3,103
Estimated emissions (t CO_2-e)[1]	5503[2]	4,775	6,671

Notes:
Estimate to nearest 100 tonnes.
[1] Reporting period is from 1 January – 31 December, recorded in SHERPA

For the 2023 period, the Total equivalent greenhouse gas (GHG) emissions for flaring were calculated using Eni's internal emissions reporting program Sherpa.

7.4 Diesel Usage

Diesel usage over the reporting period was 102m^3. This equates to GHG emissions of approximately 276 tonnes CO_2-e. This information is drawn from SHERPA 2023. SHERPA is Eni's GHG data entry program.

Table 7.4: Annual diesel consumption and GHG emissions

	2021[2]	2022[3]	2023[1]
Diesel – stationary energy (m^3)	125	64	90
Diesel – mobile plant and transport (m^3)	4	7	12
Emissions (t CO_2-e)	350	192	276

Notes:
[1] Reporting period is from 1 January – 31 December using SHERPA
[2] Reporting period as per NGER from 1 July to 30 June
[3] Reporting period is from February 2022 to January 2023. It assumes mobile plant and transport is 7m3. The fuel records show a total diesel usage of 71m^3, so the stationary energy is calculated by subtracting mobile usage from total (71-7m^3). The Emissions is calculated using interpolation with the 2020 and 2021 relationship.

7.5 Stack emission monitoring

Emissions from the export gas turbine compressors are shown in the relevant Appendix.

All pollutant emissions measured were within the EPL limits.

7.6 Fugitive emission monitoring

During November 2023, a fugitive emissions survey was undertaken at the Blacktip Yelcherr Gas Plant. The following conclusions were drawn:

Table 7.5: Fugitive Emissions Data

Classification	Gas Leak	Number of Leaks at Source	
	[Concentration / Volume]	Preliminary Reading	Validation Reading
< Minor	< 500 ppm	4	4
Minor	≥ 500 ppm to < 5000 ppm	2	2
Significant	≥ 5000 or LEL% > 10%	1	1
Total		**7**	**7**

All leaks were quantified and Tag numbers for the affected equipment was recorded. These leaks are listed in the report Bureau Veritas - ENI Australia - Fugitive Emissions Survey 2023 (November).

Work orders have been raised for inspection and repair of remaining fugitive emission sources.

7.7 Pollutant inventory reporting

Eni reports emissions to atmosphere and the environment via the National Pollutant Inventory (NPI) and the National Greenhouse and Energy Reporting Scheme (NGERS).

Eni submitted the annual NPI reporting figures via the NPI Online Reporting System on 13 September 2023. NPI details available on request.

The annual NGERS reporting figures were submitted to the Department of Climate Change on 15 September 2023. Total emissions from Yelcherr Gas Plant during the July 2022 to June 2023 NGER reporting period were 28,550 tCO_2-e.

7.8 Flaring

The HP flare header is designed for inventories above 1000kPag. The system is sized to blowdown the Hydrocarbon inventory in the YGP to achieve the required 690kPag or 50% of operating pressure (whichever is lower) within 15 minutes.

The LP flare is designed to safely dispose of regeneration offgas, and control pressure regulation during normal operation. The annual volume of gas flared from the past three years is summarised in the following table.

Table 7.6: Gas flared at YGP

	2021	2022	2023
Daily volume of gas flared (KSCM/d)	6.98	6.2	8.5
Total volume of gas flared (KSCM)	2,549	2,262	3,103
Estimated emissions (t CO_2-e)[1]	5503[2]	4,775	6,671

Notes:
Estimate to nearest 100 tonnes.
[1] Reporting period is from 1 January – 31 December, recorded in SHERPA

For the 2023 period, the total equivalent greenhouse gas (GHG) emissions for flaring was calculated using Eni's internal emissions reporting program SHERPA.

8. UNPLANNED DISCHARGES TO LAND

8.1 Groundwater Quality

Groundwater is abstracted for potable water use and ancillary equipment at Yelcherr Gas Plant. The annual groundwater abstraction volumes are summarised in Table 8.1

There are also three monitoring bores, BH5, BH7 and BH1 located at YGP. The location of the abstraction and monitoring bores are shown in Figure 8.1

Table 8.1: Total annual volume of groundwater abstracted

	2021	2022	2023
Groundwater use (ML)	22	11	15.3

Notes: Reporting period is from 1 January to 31 December.

Figure 8.1: Groundwater abstraction and monitoring bores

Groundwater monitoring bore BH-1 was reinstated during a recent Hydrogeological Survey undertaken (November 2023). These works provided a third groundwater monitoring location to allow assessment of groundwater flow direction and gradient.

An additional 2 monitoring bores (BH-Nike and PH-Sierra) were installed in late 2023 and Company will consider including these in regular groundwater sampling and monitoring events in 2024.

Volumetric flowrates are up slightly on 2022 usage, though are lower than 2021 figures.

Two ground water extraction bores (BH-1 and BH-2) draw water from the aquifer for potable and plant use.

Groundwater monitoring (BH-5 and BH-7) was conducted on 13 February 2023, 15 June 2023 and 13 July 2023. Monitoring also conducted on 7 November 2023 and 21 January 2023 included recommissioned BH-1 bore.

The results and trend analysis are presented in Attachment E.

Elevated levels of total coliforms is evident in results form in April sampling which is likely attributed to a holding time breach of samples allowing proliferation of this contaminant. Results for total coliforms returned to normal levels in subsequent sampling.

All results were within the Australian Drinking Water Guidelines and ANZECC guidelines for 80% species protection. Quarterly monitoring at both bores measured pH between 4.9 and 5.8.

8.1.1 Monitoring Objective

A Groundwater Monitoring plan is being developed. The Environmental Management Plan requires samples to be drawn from the wells. Depths of water from surface are also required to be measured.

Sampling has been ongoing. Depth measurements are returning to practice.

8.1.2 Monitoring Methods

Groundwater monitoring was undertaken by the operators and coordinated by the Environmental Advisor through 2023.

Groundwater is monitored to determine whether wastewater discharges are impacting groundwater quality. The groundwater monitoring boreholes are BH5, BH7 and BH1.

Groundwater monitoring for BH1 commenced in November 2023 after being brought online post the Hydrogeological Survey.

Sampling and monitoring will be carried out in accordance with procedures defined in BTP Operations Environmental Monitoring Requirements [000036_DV_PR.HSE.1020.000].

8.1.3 Monitoring Results

The following key trends have been captured:

Table 8.2: YGP pH Trending Data

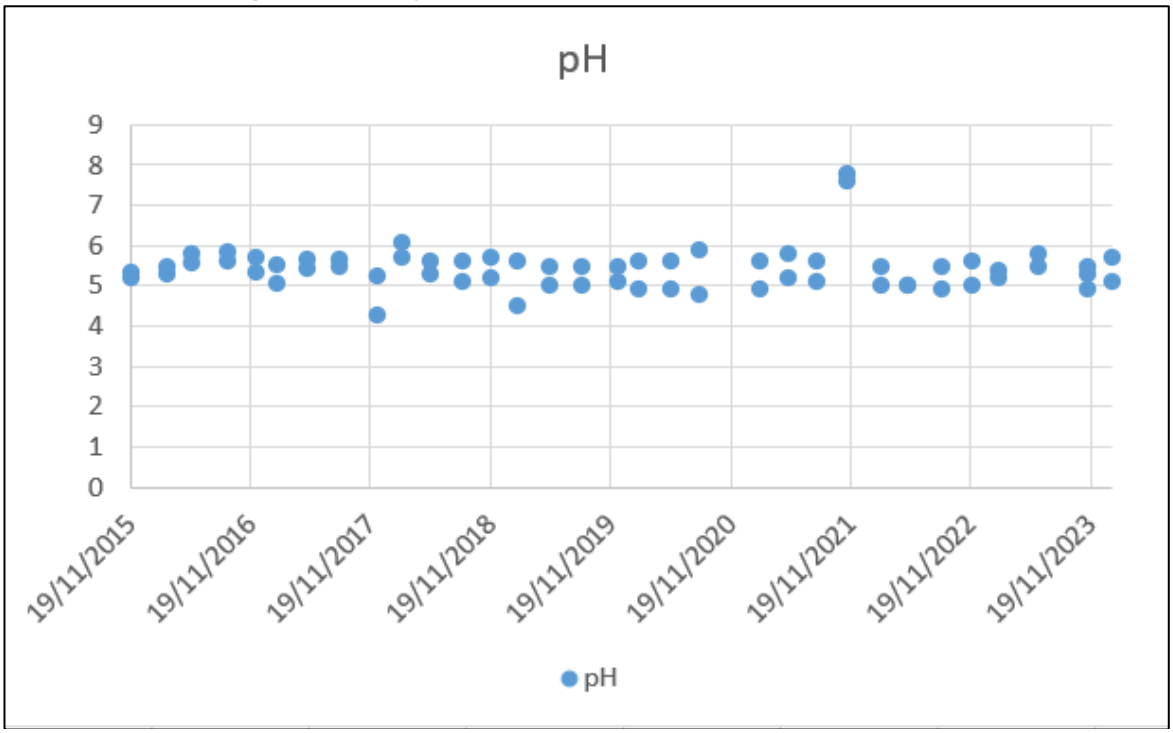


Table 8.3: YGP Electricity Conductivity (BH5/BH7) Trending Data

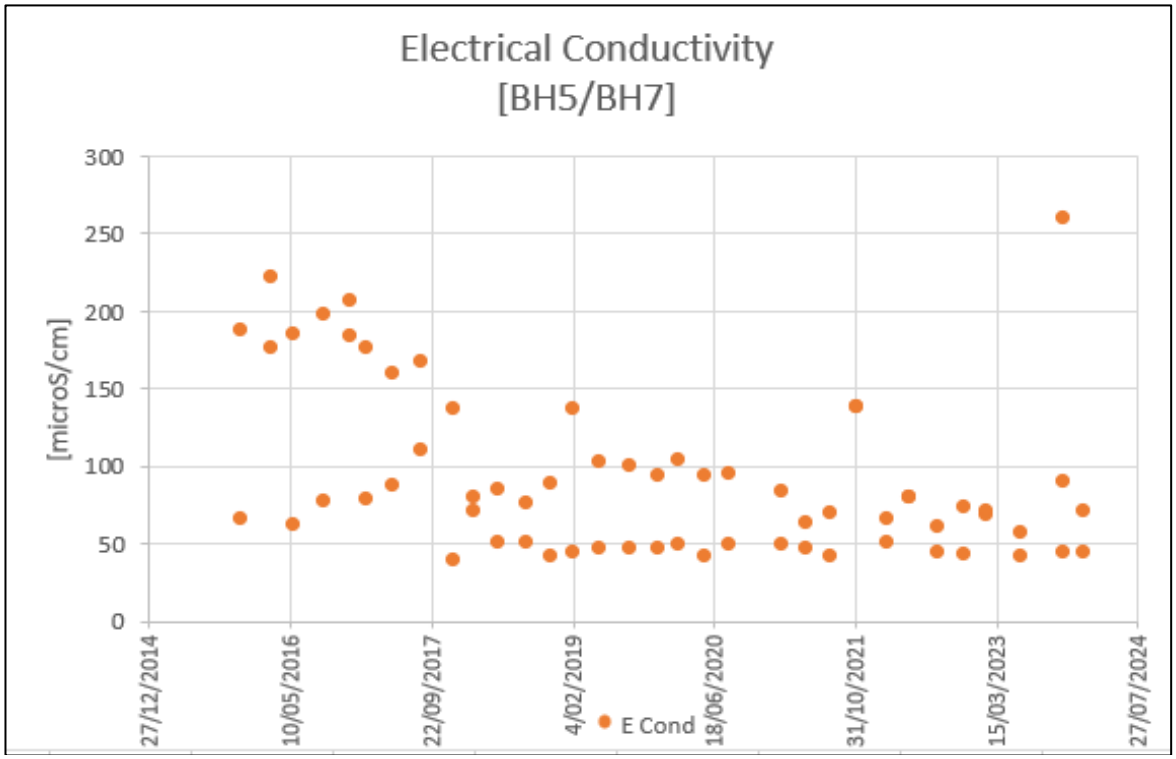


Table 8.4: YGP Dissolved Oxygen (BH5/BH7) Trending Data

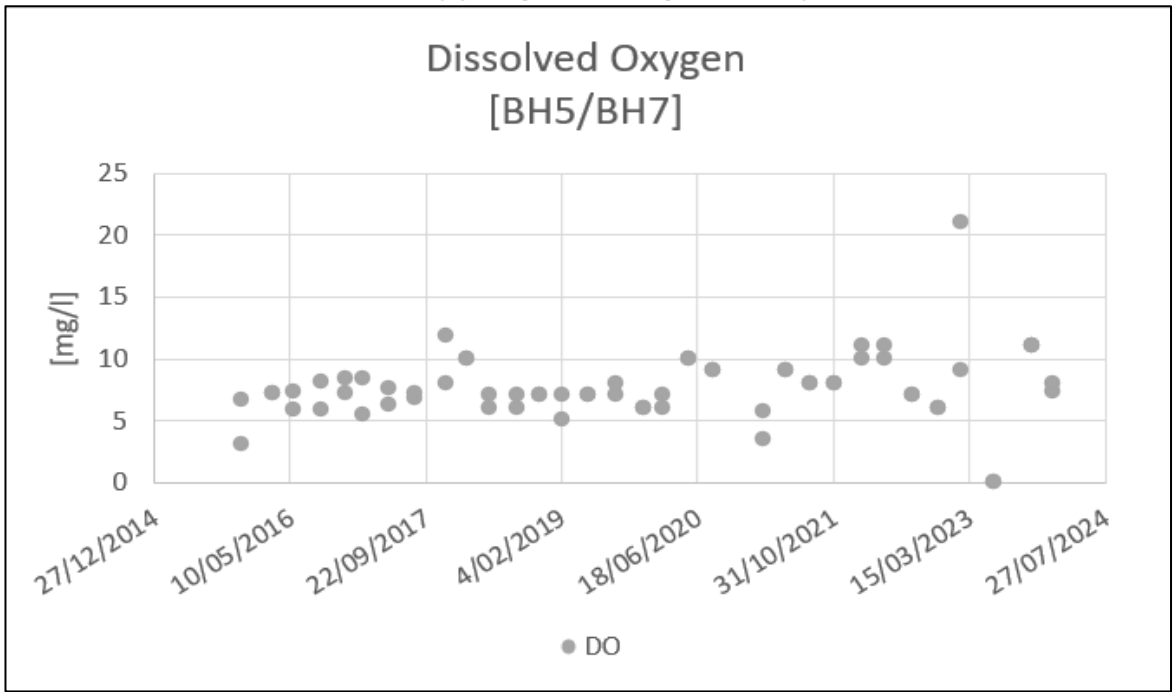


Table 8.5: YGP OiW and TPH (BH5/BH7) Trending Data

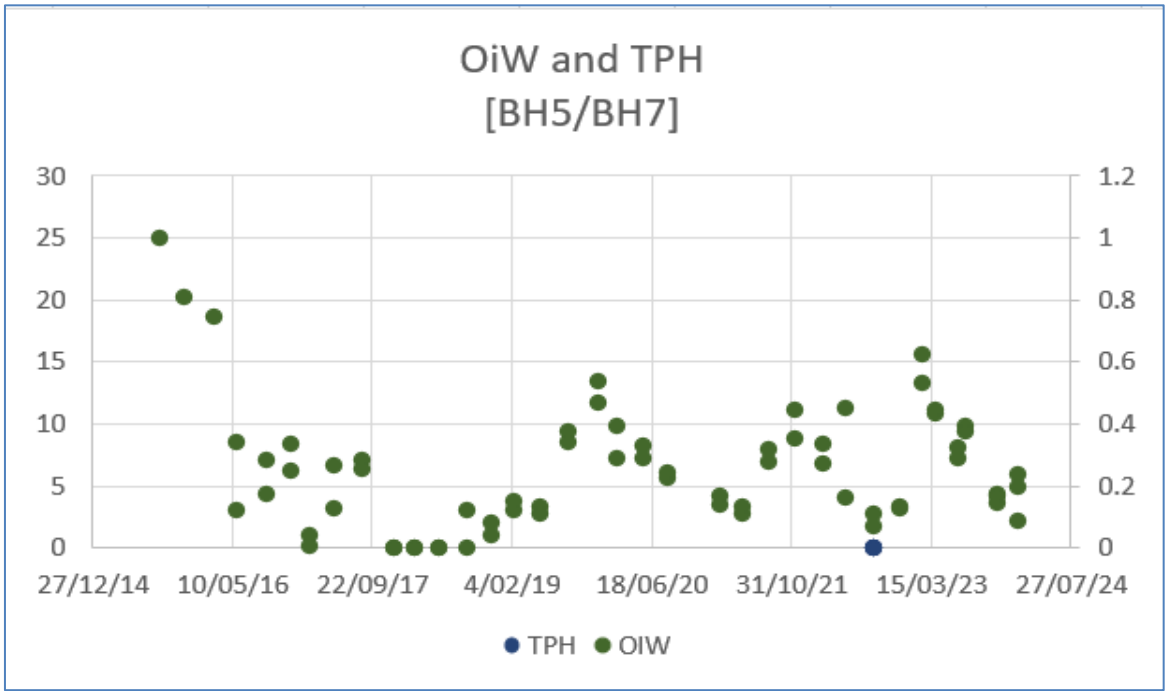
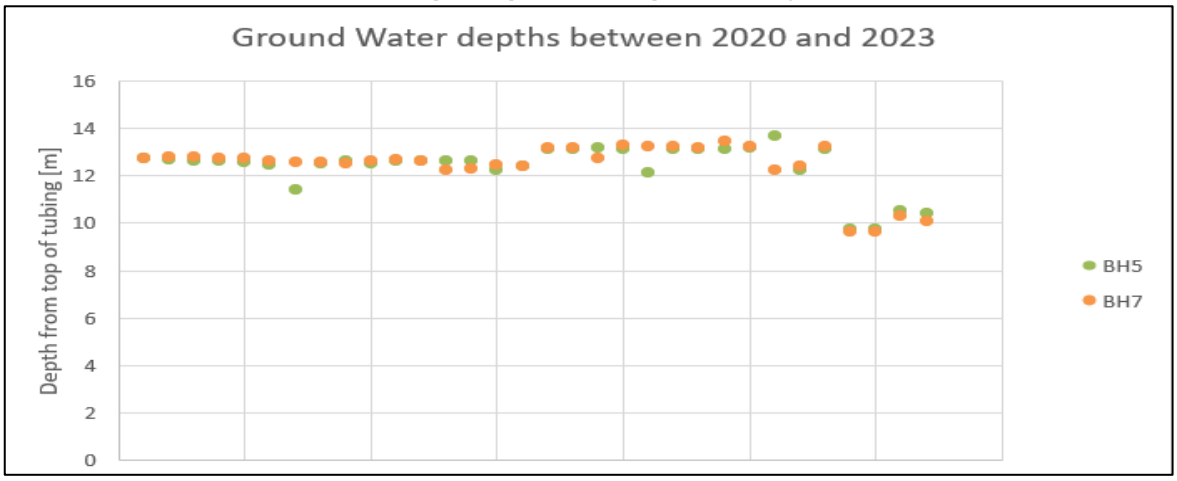


Table 8.6: Ground Water depths (BH5/BH7) Trending Data



No concerning trends or notable behaviours were identified in the other parameters. Groundwater depths (water levels) measured during the recent Hydrogeological Survey (November 2023) for BH-1, BH-5 and BH-7 were 11.71m, 11.01m and 10.95m retrospectively. More groundwater depths are available, which indicate a depth ranging between 13 meters and 9 meters. Depth data stretching back longer is available on request.

8.1.4 Data Management and Quality Control

The quality assurance/quality control (QA/QC) procedures specific to the collection and analysis of samples from sample location included:

- NATA accredited analytical laboratories were used for all analysis or a test method managed under a NATA accredited quality management system;
- Laboratory designated sample holding times met;
- Chain of custody forms was completed and accompanied the samples; and
- Calibration of all field-testing equipment using standard method(s) was undertaken.

8.1.5 Discussion and Interpretation of Results

Low level values for Oil in Water (OiW) have been present in the bore water samples. Indications Oil in Water present are suspected to be due to the analysis method (Horiba OCMA500) identifying naturally occurring Total Organic Carbon (TOC).

Total Petroleum Hydrocarbons (TPH) monitoring of bores continued in 2023 after commencing in 2022. TPH was not detected in groundwater for the majority of 2023 except for a single low level reading at BH-5 in June. This is seen as a one off event with no impact to the environment or any sensitive receivers. PH levels at this bore have since returned to baseline levels. Company will continue monitoring of TPH in bores throughout 2024.

8.1.6 Conclusions and Proposed Actions

There is no indication that negative environmental impacts are being experienced in the monitoring bores.

9. WASTE MANAGEMENT

Solid waste is managed onsite according to the Blacktip Waste Management Plan (000036_DV_PR.HSE.0832.000).

Domestic waste from the accommodation village and crib room is taken to the local West Daly Regional Shire Council Landfill. General industrial waste and hazardous waste from the plant is transported by a licensed contractor to Darwin for disposal, treatment, recycling, or destruction.

Table 9.1: Waste disposal

	2021	2022	2023
Domestic waste to local landfill (t) • Kitchen waste • Accommodation waste • Office waste	1	1	3
Darwin recycling (t) E.g. Scrap metal	3	4	6
Darwin disposal – non-hazardous (t) E.g. spent chemicals, cooking oil	22.7	58	30.83
Darwin disposal – hazardous (t) E.g. waste oil, oily rags, chemical drums and filters	85.6	63	225.92

Notes: Reporting period is from 1 January to 31 December.

A higher volume of hazardous waste was produced in 2023, resulting from a spill incident that involved the cleanup and recovery of sludge material (160 tons) in November and the increased use of filters needed to remove BTEX and metals from the Produced Water

Volume of recycled materials increased, and non-recyclables decreased reporting period.

10. INCIDENTS AND NON-COMPLIANCES

The Waste Management and Pollution Control Act (NT) and EPL require all non-compliances with the EPL and any potential or actual environmental harm or pollution event to be recorded and reported to NT EPA.

Pollution is defined in the Waste Management and Pollution Control Act (NT) as:

- A contaminant or waste that is emitted, discharged, deposited or disturbed or that escapes; or
- A contaminant or waste, effect, or phenomenon, that is present in the environment because of an emission, discharge, deposition or escape or disturbance of a contaminant or waste.

Incidents and Non-Compliances are submitted to NT EPA within 24 hours of the site being made aware of the issue.

10.1 Incidents and non-compliances

The Annual Return outlines the compliance assessment against the Environment Licence EPL230-01.

Table 10.1 lists the environmental non-compliances recorded between 10 February 2023 and 9 February 2024. These have been raised in the non-compliance register and actions are tracked to closure.

Table 10.1: Environmental non-compliances

Date of NCR	Date detected	Clause breached	Description / remarks
14/02/23	04/04/23	Condition 28	• PW above EPL Limit for OiW, Copper (Filtered), Copper (Total), Toluene, Ethyl-Benzene, Xylene,
28/03/23	15/05/23	Condition 28	• PW above EPL Limit for TSS, Copper (Filtered), Copper (Total), Toluene, Ethyl-Benzene, Xylene, • PW above trigger values over three consecutive samples for OiW, Benzene, and Zinc (Total). • WW above EPL Limit for TSS and OiW.
12/04/23	27/06/23	Condition 28	• WW above EPL limits for BOD, TSS and E.Coli
16/04/23	27/06/23	Condition 28	• PW above EPL Limits for Toluene, Xylene, Naphthalene and Total Copper, • PW above Trigger Values for 3 consecutive periods for Zinc (Total and Filtered) and Copper (Filtered)
14/05/23	29/05/23	Condition 28	• PW above EPL Limits for Toluene, Xylene, and Copper (Total and Filtered), • WW below pH and above OiW limits.
15/06/23	20/07/23	Condition 28	• WW above EPL limits for TSS
19/06/23	20/07/23	Condition 28	• PW above EPL Limits for OiW, Mn (Dissolved and Total), Toluene, Ethylbenzene, and Xylene (m+p)
13/07/23	18/08/23	Condition 28	• WW above EPL limits for BoD
16/07/23	18/08/23	Condition 28	• PW above EPL Limits for OiW, Toluene, Ethylbenzene, and Xylene (m+p), Copper (dissolved and total), Mn (dissolved and total), Toluene, Ethylbenzene, and Xylene (m+p)
05/08/23	18/09/23	Condition 28	• PW above EPL Limits for Toluene, Xylene (m+p), Zinc (dissolved and total), pH

Date of NCR	Date detected	Clause breached	Description / remarks
15/08/23	18/09/23	Condition 28	• Blacktip - YGP - Non-compliance with EPL230-01 - Waste Water monitoring parameters measured above limits.
12/09/23	27/10/23	Condition 28	• PW above EPL Limits for Toluene, Xylene (m+p), Zinc (dissolved and total), Manganese (dissolved and total), Copper (dissolved and total), and OiW
07/11/23	30/11/23	Condition 28	• PW above EPL Limits for Toluene, Xylene (m+p), Zinc (total), Manganese (dissolved and total)
08/11/23	30/11/23	Condition 28	• WW above EPL limits for TSS
10/10/23	21/11/23	Condition 28	• PW above EPL Limits for Toluene, Ethyl benzene, Xylene (m+p), Zinc (dissolved and total), Manganese (dissolved and total)
10/11/23	10/11/23	Condition 19.1 & 19.2	• During transfer of sludge from main tank to ISO tanks the transfer hose parted and sludge spilled to grade
13/12/23	19/01/24	Condition 28	• Waste Water monitoring parameters measured above limits for TSS, 50 mg/l (EPL limit = 30mg/l)
18/12/23	19/01/24	Condition 28	• Produced Water monitoring parameters measured above limits for Copper (filtered), Copper (total), Zinc (total), Toluene and Xylene.
17/01/24	16/02/24	Condition 28	• Waste Water above EPL limits for E.coli
22/01/24	16/02/24	Condition 28	• Produced Water above EPL Limits for OiW, Toluene, Ethylbenzene, and Xylene (m+p), Copper (dissolved and total), Mn (dissolved and total), Toluene, Ethylbenzene, and Xylene (m+p).

10.2 Complaints

No complaints were received during the reporting period.

10.3 Audits and inspections

An onsite monitoring event by NT EPA Authorised Officers was conducted in June 2023 which included the collection of water samples from PW-02 to be analysed for BTEX and heavy metals. These samples were taken during a time when no discharge was occurring (preparation only)

Senversa Pty Ltd was engaged to conduct an environmental audit of certain aspects of operation at the Yelcherr Gas Plant (YGP) in response to being issued with a Section 48(1) Notice by NT EPA. The site inspection component of the audit was undertaken from 22nd to the 25th of February 2023 with the Audit being finalised for submission on the 13th October 2023.

Company conducted an Environmental Audit at the wastewater treatment plan against Yelcherr Gas Plant (YGP) EPL 230-01 Licence Conditions in May 2023.

Company conducted a 5 yearly Wastewater Treatment Plant Performance Review in July 2023.

CONTINUOUS IMPROVEMENT AND OTHER ACTIVITIES

The following activities were completed during the reporting period to continually improve compliance to EPL230-01 requirements:

- A Comprehensive annual fugitive emissions survey to monitor for gas leaks across YGP was conducted in November 2023;
- A Comprehensive annual venting validation survey to monitor venting sources at YGP was conducted in November 2023;
- A hydrogeological survey was undertaken at YGP (November 2023) to establish an assessment of potential risk to groundwater and provide a third monitoring location to allow improved assessment of groundwater;
- Thamarrurr Rangers participated water outfall sampling training to be used for future sampling exercises;
- A trial skid to remove metalloids from Produced Water has been engineered in preparation for installation in Q2 2024;
- An emergency exercise has been carried out at YGP involving and assessing the Thamarrurr Rangers in first responder capabilities in the event of a hydrocarbon spill in the offshore area (off shore water sampling and monitoring);
- An in depth energy efficiency assessment in accordance with the requirements of ISO50001 was completed;
- Engaged a new third party contractor to conduct site based EPL230-01 monitoring and analysis programme;
- In accordance with Section 48(1), a third party consultant was engaged to conduct an independent environmental audit of the Yelcherr Gas Plant (YGP) on behalf of the NT EPA; and
- Company conducted an Environmental Audit and a 5 Yearly Performance Review of the wastewater treatment plant.

11. COMMUNITY INITIATIVES

Eni and the Thamarrurr Rangers continue to work closely to identify opportunities for local engagement and achieve positive environmental outcomes.

Eni continues to maintain a positive and engaging relationship with the Thamarrurr Rangers, who deliver local environmental monitoring services such as, but not limited to:

- Monitoring of offshore assets (e.g. Single Point Mooring (SPM) and hose);
- Wild fire management;
- Controlled burning;
- Weed and pest monitoring and eradication;
- Marine monitoring;
- Sea turtle monitoring;
- Fauna monitoring and relocation;
- Provision of vessel and crew for offshore environmental sampling;
- Emergency Response: Initial Oil Spill Monitoring Capabilities;
- PW-01 (Produced Water discharge point) monitoring; and

Containers for Change (plastic bottle recycling).

The SPM monitoring conducted by the Rangers includes inspection of the SPM equipment as well as inspection of the surrounding waters for surface sheen and possible spills. This provides a valuable contribution to the safe offtake of condensate and is an important part of Eni's scheduled maintenance. The Rangers also support the YGP groundwater monitoring, marine monitoring and weed management programs.

In 2023, Thamarrurr Rangers participated in training for water outfall sampling and monitoring to be used in the future. This will support validation of the mixing zone at PW-01.

The regular monitoring by the rangers allows our site-based personnel to engage with local indigenous community members, providing a greater appreciation of the region and the importance of caring for country.

12. ABBREVIATIONS

Abbreviation	Description
BTEX	Benzene, Toluene, Ethylbenzene, Xylene
BOD	Biological Oxygen Demand
EPL 230-01	Environmental Protections Licence (EPL230-01)
Kscm	Thousands of standard cubic meters
ML	Mega-litres
Mn	Manganese
NGER	National Greenhouse and Energy Regulator
NPI	National Pollutant Inventory
NT EPA	Northern Territory Environment Protection Authority
OiW	Oil in Water
tCO2-e	Tonnes of Carbon Dioxide equivalent
TSS	Total Suspended Solids
YGP	Yelcherr Gas Plant
Zn	Zinc

13. REFERENCES

[1] COMMONWEALTH OF AUSTRALIA (DEPARTMENT OF THE ENVIRONMENT AND ENERGY) (2019). NATIONAL GREENHOUSE ACCOUNTS FACTORS. AUGUST 2019.

[2] ENI AUSTRALIA BV (2020). NATIONAL GREENHOUSE AND ENERGY REPORTING SECTION 19 - ENERGY AND EMISSIONS REPORT FOR THE REPORTING YEAR 2019-2020. 5 OCTOBER 2020.

[3] PREMIER'S COLLABORATIVE RESEARCH PROGRAM (PCRP) (2009). CHARACTERISING TREATED WASTEWATER FOR DRINKING PURPOSES FOLLOWING REVERSE OSMOSIS TREATMENT: TECHNICAL REPORT.

[4] WEATHERFORD LABORATORIES (AUSTRALIA) PTY LTD (2009A). PVT ANALYSIS - FINAL REPORT 1288-06 FOR BLACKTIP-P2. DOCUMENT NUMBER BT-P2_A2. UNPUBLISHED REPORT PREPARED FOR ENI AUSTRALIA LTD.

[5] WEATHERFORD LABORATORIES (AUSTRALIA) PTY LTD (2009B). COMPOSITIONAL ANALYSIS - FINAL REPORT 1300-06 BLACKTIP-P1 (3RD BATCH). DOCUMENT NUMBER BT-P1_A4. UNPUBLISHED REPORT PREPARED FOR ENI AUSTRALIA LTD.

[6] WOODSIDE (2007). BLACKTIP DRAFT ENVIRONMENTAL IMPACT STATEMENT.

[7] WORLD HEALTH ORGANISATION (2003). HETEROTROPHIC PLATE COUNTS AND DRINKING-WATER SAFETY: THE SIGNIFICANCE OF HPCS FOR WATER QUALITY AND HUMAN HEALTH. AVAILABLE ONLINE AT: <HTTP://WWW.WHO.INT/WATER_SANITATION_HEALTH/DWQ/HPCFULL.PDF>. PUBLISHED ON BEHALF OF THE WORLD HEALTH ORGANISATION BY IWA PUBLISHING, ALLIANCE HOUSE, UK.

[8] WORLEY PARSONS (2011). GREENHOUSE GAS EMISSIONS: STUDY OF AUSTRALIAN CSG TO LNG. PREPARED BY WORLEY PARSONS FOR APPEA.

ATTACHMENTS

ATTACHMENT A:

AIR EMISSIONS MONITORING PROGRAMME

Attachment A.1: Summary of stack emission monitoring results from the compressors

	CO	NOx[1]	SOx	Solid particles	VOCs
EPL limit	**100 mg/m³**	**350 mg/m³**	**100 mg/m³**	**-**	**40 mg/m³**
October 2021					
Compressor A	<8	210	*<8*	*27*	0.55
Compressor B	<9	230	*<8*	*4.1*	0.18
Compressor C	<8	240	*<8*	*20*	1.8
April 2022					
Compressor A	<7	320	*NT*	*NT*	<0.2
Compressor B	<8	250	*NT*	*NT*	0.18
Compressor C	<7	320	*NT*	*NT*	<0.2
November 2022					
Compressor A	<9	210	*21*	*<2*	0.17
Compressor B	NT	NT	NT	NT	NT
Compressor C	NT	NT	NT	NT	NT
November 2023					
Compressor A	NT[6]	NT [6]	NT [6]	NT [6]	NT [6]
Compressor B	NT [6]	NT [6]	NT [6]	NT [6]	NT
Compressor C	25	320	<2	<2	1.8

Notes:
[1] NOx presented as NO_2 equivalent.
[2] SOx presented as the cumulative concentration of SO_2 and SO_3.
[3] All measurements reported on a dry basis at NTP and corrected to 15% O_2 in accordance with the EPL.
[4] Measurements above the EPL limit are indicated in red, and measurements above the trigger value are indicated in orange.
[5] NT = Not tested.
[6] Compressor A & B were not operational at time of testing due to unplanned maintenance.

Attachment A.2: Summary of stack emission monitoring results from the generators

	CO	NOx[1]	SOx	PM	VOCs
EPL limit	**1600 mg/m^3**	**2000 mg/m^3**	**100 mg/m^3**	**-**	**40 mg/m^3**
October 2021					
Generator A	770	1500	*<20*	*8.9*	11
Generator B	750	1500	*<20*	*3.4*	36
Generator C[8]	NT[8]	NT[8]	*NT[8]*	*NT[8]*	NT[8]
April 2022					
Generator A	1100	2000	NT	NT	0.38
Generator B	1100	2000	NT	NT	0.58
Generator C	NT[8]	NT[8]	NT[8]	NT[8]	NT[8]
November 2022					
Generator A	730	1400	<2	NT	4.8
Generator B	610	1400	<4	NT	0.42
Generator C	520	1200	<2	NT	9.2
November 2023					
Generator A	NT[8]	NT[8]	NT[8]	NT[8]	NT[8]
Generator B	1200	2000	<2	<3	1.3
Generator C	860	1700	<2	<2	0.85

Notes:

[1] NOx presented as NO_2 equivalent.

[2] SOx presented as the cumulative concentration of SO_2 and SO_3.

[3] All measurements reported on a dry basis at NTP and corrected to 15% O_2 in accordance with the EPL.

[4] Measurements above the EPL limit are indicated in red, and measurements above the trigger value are indicated in orange.

[5] Emissions sampling provider advised that levels of methane (160-200mg/m^3) can cause an interference with the SO_2 cell of the analyser

[6] NT = Not tested.

[7] June 2020 emissions testing was deferred due to COVID travel restrictions.

[8] Gas Engine Generator was not operational due to unplanned maintenance

Attachment A.3: Air emissions annual pollutant mass inventory (Source – NPI (Appendix C) and 2021 NGER report – Info only)

Atmospheric Emission Points			Annual Pollutant Mass (t)								
Point ID	**Description**		**SO_2**	**NOx**	**CO**	**VOC**	**PM_{10}**	**CO_2**	**CH_4**	**N_2O**	**CO_2-e**
A01 **A02**	**High Pressure Flare** **Low Pressure Flare** **Flare Fuel Gas**	2018-2019	0.06	4.4	26	44	0	7,917	11.7	0.3	8,298
		2019-2020	0.08	5.4	32	54	0	9,712	14.4	0.4	10,180
		2020-2021	0.05	3.1	18	31	0	5,664	279	54.5	5,998
A03 **A04** **A05**	**Gas Compressor A** **Gas Compressor B** **Gas Compressor C**	2018-2019	0.2	125	40	1	0.9	35,165	3	0.07	35,254
		2019-2020	0.3	160	48	1	1.1	42,388	3	0.08	42,496
		2020-2021	0.3	172	48	1.2	1.1	40,691	79	23	40,794
A06 **A07** **A08**	**Engine Generator A** **Engine Generator B** **Engine Generator C**	2018-2019	0.03	347	19	4	<0.003	3,653	0.28	0.007	3,663
		2019-2020	0.02	191	19	4	<0.003	3,661	0.28	0.007	3,670
		2020-2021	0.02	130	19.7	4.2	2.7	3,682	7	2	3,691
A09	**Emergency Diesel Generator limits**	2018-2019	<0.001	3.1	0.8	0.08	0.01	159	0.009	0.002	160
		2019-2020	<0.001	1.9	0.5	0.05	0.06	97	0.006	0.001	97
		2020-2021	0.002	5.9	1.6	0.15	0.1	303	0.43	0.87	305
-	**Condensate Tank vents limits**	2018-2019	-[2]	-[2]	-[2]	-[2]	0	-	-	-	-
		2019-2020	-[2]	-[2]	-[2]	-[2]	0	-	-	-	-
		2020-2021	-[2]	-[2]	-[2]	-[2]	0	-	-	-	-

[1] SOx, NOx and CO figures are as per the NPI reports and associated estimation techniques, and CH_4, N_2O and CO_2 are as per NGER reports and associated estimation techniques.

[2] Not available or below threshold (i.e. for NPI substances, SO_2, NOx, CO).

ATTACHMENT B:

PRODUCED WATER MONITORING

Routine produced water discharge sampling and analysis

DATE	Quantity	Average OiW	pH	EC	Dissolved Oxygen	Temp	Turbidity
Units	m3/d	mg/l	unitless	µS/cm	% saturation	˚C	NTU
Limit		6 to 25	6.5-8.5				
13-Feb-23	222	21.3	8.1	69.76		29.5	19.6
14-Feb-23	98.2	22.4	8.3	71.8		30.2	21
15-Feb-23	216.5	15	7.49	68.9		29.8	30
16-Feb-23	255.1	15	7.49	68.4		32.1	40.1
17-Feb-23	103	17.8	7.62	67.9		31	29
18-Feb-23	108.6	14.7	8.1	68.94		33	15.6
19-Feb-23	78.8	18.2	8.47	68.92		32.1	26.8
20-Feb-23	116.2	17.2	8.34	68.75		32.5	19
21-Feb-23	165	19.3	8.3	68.4		30.6	21.2
24-Feb-23	146	21	8.2	69.75		23.6	46.2
26-Feb-23	269	20	7.3	68.1		28.2	31.3
27-Feb-23	150	24	8.4	68		23.8	36.4
28-Feb-23	407.1	19.5		65.8		27.8	67.8
01-Mar-23	207	11.2	7.3	68.77		29.1	30.2
02-Mar-23	203	10.3	7.4	66.3		31	67.1
03-Mar-23	185	8.2	8.4	41.9		30.1	19.9
05-Mar-23	180	6.5	7.6	155.7		28.9	3.6
06-Mar-23	151.4	10.1	8.4	43.71		27.9	28.1
07-Mar-23	78.5	15	7.8	481.2		30.2	5.43
08-Mar-23	102.23	16.9	7.82	69.49		33.7	16.9
09-Mar-23	147.1	24	8.28	29.2		25.8	15.8
10-Mar-23	144.5	11.2	7.35	70.09		30.9	17
11-Mar-23	85.9	16.8	8.2	222.6		24.6	16.1
12-Mar-23	142.2	11.8	7	67.46		31.3	11.9
13-Mar-23	128	15.9	8.25	96.24		30	15.8
14-Mar-23	133	23.4	8.36	115.3		29	16.4
15-Mar-23	127.6	19.2	6.8	127.3		29	5.4
18-Mar-23	80	16.1	6.78	11.94		31	9.8
19-Mar-23	95.8	13.7	7.29	304.3		30	14.6
20-Mar-23	67.1	21.8	6.71	71.34		31	13
23-Mar-23	447	7.9	7.1	630		30	13.4
24-Mar-23	73.1	16.4	8.13	754.1		32	13.3
31-Mar-23	85.1	10.1	7.89	3.58		31.1	21.1
02-Apr-23	218.8	8.7	8.3	70	3	32	22
03-Apr-23	11.3	18.2	7.4				
04-Apr-23	100.1	18.2	7.4	70	3.3	30.1	24.8
07-Apr-23	434.9	10.3	7.8	70.5		29.1	17
08-Apr-23	148.1	10.5	7.9				
11-Apr-23	99.2	1.1	7.9				
13-Apr-23	75	8.7	6.91				
16-Apr-23	101.1	13.7	7.7	69.51	0.1	29.2	37.1
18-Apr-23	474.6	12.67	7.3	71.1		28.7	41.2
23-Apr-23	284.4	21.8	6.6	68.87		29.7	87
24-Apr-23	115.9	9.4	8.39	72.3		29.8	62
28-Apr-23	332.2	23.9	8.3	125.6	2	22.8	71
01-May-23	579.6	14.6	8.2	67.65		30	79.4
05-May-23	10	12.4	8				
06-May-23	118.9	12.4	8	69.7	1.2	28.9	134
07-May-23	378.4	16.9	8.2	70.74	2.7	30.2	22
09-May-23	216.5	2.2	8.5	71		28	55
10-May-23	199.8	15.9	7.2	69.17		29.4	72.3
11-May-23	87.7	18.1	8.4	76	2	29.1	16.5
14-May-23	388.74	5.6	7.9	68.9		28.1	2.5
16-May-23	81.8	5.8	8.3	69.5		28.7	3.9
17-May-23	46.9	8.8	8.4	72.3	1.7	28.6	10.9
18-May-23	303.5	12.9	8.28	68.9		28.1	20.5
19-May-23	121.2	5.4	8.49	71.65	1	28.7	7.95
20-May-23	203.1	5.6	7.9	69.64	2	26.7	19

DATE	Quantity	Average OiW	pH	EC	Dissolved Oxygen	Temp	Turbidity
Units	m3/d	mg/l	unitless	µS/cm	% saturation	˚C	NTU
Limit		6 to 25	6.5-8.5				
21-May-23	147.7	6.3	8.4	70.5	7.2	26	185
22-May-23	133.3	11.5	8.38	69.1		24.2	9.1
23-May-23	175.7	11.8	8.3	72.4	6.4	27.2	24
24-May-23	206.2	16	7.9	66.49	7.1	24.5	4.8
26-May-23	53	10.8	6.94	68.24	1.9	26.5	3.81
29-May-23	257.6	10.4	8	66.7	6.1	25	44.7
31-May-23	108	21.6	8.3				
01-Jun-23	108	21.6	8.3	67.2	3.1	25	275
02-Jun-23	277.8	12.1	8.4	69.5	6.8	25	78
03-Jun-23	221.6	7.6	8.116	72	3.1	31.2	42.4
04-Jun-23	510	4.9	7.4	68.4	3.4	32	8.05
05-Jun-23	108.9	15.4	8.3	66.9	5	24	61
06-Jun-23	588.6	6	7.2	70	6	26	71
09-Jun-23	640.2	22.8	7.179	69.4	3.5	28	39.3
14-Jun-23	426	6	8.35	70.3	6.1	28.9	43.9
19-Jun-23	557	2	8.4	72.9	5.2	28.1	6.4
22-Jun-23	551.8	16.7	8.49	68	0	26	67.4
27-Jun-23	579.1	1.4	8.08	71	5.8	23	85
30-Jun-23	632	5.7	8.38	69.12	5.9	29	68.9
06-Jul-23	530.2	0	8.39	69.12	175	30.7	2.08
06-Jul-23	125.7	0.1	8.4	67.72	124	25.3	3.38
09-Jul-23	386	9.3	6.85	48.29	167	26.6	31.9
14-Jul-23	536.2	16.3	8.417	68.96	2.5	28.1	9.94
16-Jul-23	405.4	9.6	8.47	1.87	0.2	29.8	42.4
17-Jul-23	380.4	13	7.02	72.03	1.9	29.9	10.1
19-Jul-23	203.3	12.6	8	69.1	1.9	24.4	14.1
24-Jul-23	236.4	13.1	7	69.1	5.4	26	69
24-Jul-23	552.27	5.4	8.04	68.25	0.3	24.8	51.3
26-Jul-23		7.8	8.3	68.21	3.1	21	32.9
29-Jul-23	381.3	13.3	8.37	83		28.1	9.1
02-Aug-23	483.6	18	8.41	0.789	5.4	28.1	6.8
05-Aug-23	429.86	4.8	8.25	69.4	4.6	22.1	42.6
08-Aug-23	301.11	2.2	8.315	70	0.9	25	77.4
10-Aug-23	45.4	4.3	6.5	78	0.9	27	71.5
18-Aug-23	150.7	11.9	7.27	71	2.6	26	68
20-Aug-23	391.4	13.3	7.17	79	2.1	27	55
22-Aug-23	402.5	21.1	6.7	68	4.1	26	23.5
24-Aug-23	414.9	3.35	7.2				
26-Aug-23	550	5.6	7.4	71.65	4.6	26.8	8.51
29-Aug-23	207.2	12.9	6.602	69.63	2.5	32.3	14
30-Aug-23	428	10.5	6.75	71.6	4.1	29.8	9.1
02-Sep-23	412.53	7.5	6.95	71.1	6.2	30.5	8.1
03-Sep-23	202.39	9.85	6.92				
05-Sep-23	502.3	20.9	6.793	975.8	182	22.3	7.28
07-Sep-23	288	5.1	6.568	71.12	4.6	28.4	6.27
08-Sep-23	164.37	8.3	8.434	69.89	5.2	24.9	23.9
09-Sep-23	136.9	7.2	6.85				
10-Sep-23	306.22	8.8	6.87				
12-Sep-23	277.16	9.375	6.79				
14-Sep-23	281.6	5.1	7				
18-Sep-23	341.6	8.3	8.43				
19-Sep-23	310.3	9.9	7.984	70.03	4	29.5	36
22-Sep-23	54.03	17.9	8.1				
24-Sep-23	312.63	15.9	8.4				
25-Sep-23	272.43	11.1	8.67				
27-Sep-23	246.2	17.8	8.27	69.4	3.8	31.5	4.1
28-Sep-23	194.25	5	8.15				
29-Sep-23	73.47	21.9	8.027	72.02	121	26.4	22.9
30-Sep-23		6.7	8.08	72.01	20	28.5	12.3
02-Oct-23	348.6	9.5	8.2	71	4.2	28	31

DATE	Quantity	Average OiW	pH	EC	Dissolved Oxygen	Temp	Turbidity
Units	m3/d	mg/l	unitless	µS/cm	% saturation	˚C	NTU
Limit		6 to 25	6.5-8.5				
04-Oct-23	193.7	11	7.87	72.31	49.1	28.9	14.4
05-Oct-23	112.18	11	7.87				
10-Oct-23	407.94	4.7	8.14	71.05	73.8	30	7.2
11-Oct-23	36	7.55	7.58				
12-Oct-23	287	16.8	6.61	71.64	7.94	29.8	5.81
13-Oct-23	57.55	16.8	6.99				
14-Oct-23	377.13	4.1	7.69	71.1	21.8	29.6	4.1
16-Oct-23	297.2	5.4	8.47	71.54	10.1	29.9	20.4
17-Oct-23	64.67	6.05	8.27				
18-Oct-23	438.11	8.4	8.4	70.13	N/A	30.3	12.2
21-Oct-23	400.02	7.7	7.85	69.77	N/A	33.3	13.8
24-Oct-23	578.8	2	7.02	70.83	N/A	29	5.16
26-Oct-23	201.55	8	6.8	70.22	N/A	31.7	9.7
28-Oct-23	364.96	3.7	8.4	71	3.5	31	36
29-Oct-23	230.3	20	8.24	69	3.4	31	24
30-Oct-23	164.37	16	8.45	61	3.9	31	29
01-Nov-23	214.22	17.9	8.31	71	N/A	29.6	32
02-Nov-23	185.1	17.9	7.8				
03-Nov-23	121.3	23	8.2	75	N/A	31	29
04-Nov-23	147.2	18	8.3	79	N/A	32	38
07-Nov-23	201.84	7	8	65	N/A	32	31
08-Nov-23	269.61	15.4	8.39	71.74	0.29	29.4	12.2
09-Nov-23	128.1	5.1	7.6	71.61	0.24	28.8	17.9
11-Nov-23	241.29	5.4	7.7	70.2	1.2	23.7	5.26
13-Nov-23	226.9	9.4	8.44	70.04	0.6	31.8	0.81
18-Nov-23	311.5	10	7.78	78.32	85	29.8	18.5
19-Nov-23	158.94	11.3	6.84	72.32	14.8	26.9	34.7
20-Nov-23	269.2	13.1	7.3	72.45	28	31.7	11.7
22-Nov-23	74	8.2	8.2				
23-Nov-23	74	8.2	8.2	71.24	17.9	32.8	4.52
27-Nov-23	57.9	21.9	8.26	70.91	3.2	32.8	5.13
28-Nov-23	171.8	23.5	7.9	72.14	2	30.1	28
07-Dec-23	118.3	6.1	8.3	71.17	3.3	29.1	11.3
08-Dec-23	118.3	6.1	8.3				
18-Dec-23	149.7	10	8.1	69	3.8	34	31
30-Dec-23	12.7	17.3	8.29				
03-Jan-24	300.18	16.8	8.01	8.46	62	22.5	13.2
05-Jan-24	180.1	15.6	8.1	70.8	1.5	33.9	12.8
09-Jan-24	253.99	7.6	7.8	71.99	2	33	23.7
10-Jan-24	120.8	6.3	7.5	70.35	18	29	40.6
22-Jan-24	128	0.3	7.8	70.94	47	30.8	1.8

Produced water sampling and analysis

Sample Date	pH	Elec Cond	DO	Temp	Turbidity	BOD	COD	TSS	TDS	TOC	OiW
	unitless	µS/cm	%Sat	˚C	NTU	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l
Trigger Value	6.5 -8.5							10			6
Limit								50			25
22/01/2024	8.3	75,000			0.82	520	3,100	10	50,000	740	34.4
15/12/2023	8.2					270	4,400	8	53,000	720	22.8
7/11/2023	8.2	73,000						<5	53,000		22.4
15/10/2023	7.8					240	1,400	<5	51,000	330	12.3
12/09/2023	7.2	77,000			38	190	1,100	14	53,000	280	25.4
5/08/2023	8.8	73,000			2	360	920	<5	50,000	210	20.1
16/07/2023	8.3	67,000			12	150	2,400	13	48,000	490	88.1
19/06/2023	7.9	70,000			10	160	3,000	<5	46,000	1000	25.5
14/05/2023	7	63,000			1.1	180	5,100	6	52,000	1400	19.3
16/04/2023	8.1	63,100	9		13	857	3,380	20	47,000	724	18.6
28/03/2023	8.8	62,200	9		76	795	2,780	110	45,900	564	20.7
14/02/2023	8.2	61,700	10		6	5.3	2,660	20	45,700	471	31.9
24/01/2023	8.1	63,300	10		76	5.2	3,640	160	47,600	616	20.4

Produced water sampling and analysis continued…..

Sample Date	Total Phos	Total Nitro	Oxid. Nitro (NOx)	Ammon. N (NH3-N)	Nitrate (NO3-)	Nitrite (NO2-)	Al_F	Al_T	As_F	As_T
	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	µg/L	µg/L	µg/L	µg/L
Trigger Value										
Limit										
22/01/2024	<0.50	38	<0.0050	33	<0.0050	<0.0050	130	100	<2.0	<2.0
15/12/2023	<0.25	44	<0.005	38	<0.005	<0.005	<20	130	<2.0	<2.0
7/11/2023							<20	<20	<2	<2
15/10/2023										
12/09/2023	<0.1	42	<0.05	38	<0.05	<0.2	21	81	<2	<2
5/08/2023							<20	29	<2	<2
16/07/2023	<0.25	42	0.0077	40	<0.005	<0.005	<10	97	<1	<1
19/06/2023	<0.25	47	0.01	42	<0.02	0.029	540	490	<2	<2
14/05/2023	<0.25	40	<0.005	39	<0.005	<0.005	330	340	<1	<1
16/04/2023	<0.025	37.8	0.01	37.7	0.01	<0.005	86.1	123	<2	<2
28/03/2023	<0.025	43.5	<0.025	41.6	<0.025	<0.005	49.1	52.3	<2	<2
14/02/2023	<0.025	45.5	<0.005	44.3	<0.005	<0.005	41.5	71.9	3.8	4.5
24/01/2023	<0.025	42.8	0.045	42.4	0.045	<0.005	2	28.2	<2	2.6

Produced water sampling and analysis continued…..

Sample Date	Ba_F	Ba_T	Be_F	Be_T	B_F	B_T	Cd_F	Cd_T	Co_F	Co_T
	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
Trigger Value										
Limit										
22/01/2024	100,000	100,000	<1.0	<1.0	3,900	3,300	<0.2	0.24	<2	<2
15/12/2023	120,000	110,000	<1.0	<1.0	3,700	2,500	<0.2	0.22	<2	<2
7/11/2023	110,000	160,000	<1	<1	4,200	3,600	<0.2	<0.2	<2	<2
15/10/2023										
12/09/2023	120,000	120,000	<1	<1	4,800	6,800	0.26	0.32	<2	<2
5/08/2023	100,000	110,000	<1	<1	4,100	3,800	<0.2	0.84	<2	<2
16/07/2023	110,000	110,000	<0.5	<0.5	2,400	2,400	0.66	<0.1	<1	<1
19/06/2023	97,000	96,000	<1	<1	4,400	4,900	<0.2	<0.2	<2	<2
14/05/2023	99,000	92,000	<0.5	<0.5	3,500	3,200	<0.1	<0.1	<1	<1
16/04/2023	88,200	94,300	<2	<2	3,010	3,120	<0.8	<0.8	<0.4	<0.4
28/03/2023	90,800	88,900	<2	<2	4,360	4,010	<0.8	<0.8	<0.4	<0.4
14/02/2023	92,400	105,000	<2	<2	2,760	3,040	<0.8	<0.8	<0.4	<0.4
24/01/2023	87,600	96,000	<2	<2	3,580	3,480	<0.8	<0.8	<0.4	<0.4

Produced water sampling and analysis continued…..

Sample Date	Cu_F	Cu_T	Cr_F	Cr_T	Cr III	Cr VI	Fe_F	Fe_T	Hg_F	Hg_T
	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
Trigger Value	3	3								
Limit	8	8								
22/01/2024	9.4	7.2	<2	<2	<50	<50	4,400	4,800	0.68	0.7
15/12/2023	9.3	10	<2	<2	<25	<25	470	510	0.21	0.23
7/11/2023	9.9	10	<2	<2	<25	<25	370	680	0.12	0.1
15/10/2023										
12/09/2023	16	16			<25	<25	140	3,800	0.05	0.06
5/08/2023	8.3	8.6	<2	<2	<25	<25	69	110	<0.05	0.095
16/07/2023	10	9.7	2.5	2.1	<25	<25	23	1,400	0.18	0.18
19/06/2023	7.8	7.3	4.8	3.7	<0.05	<0.05	7,300	7,500	<0.5	0.26
14/05/2023	1	1	2	2	<0.05	<0.05	950	980	0.67	1.1
16/04/2023	5.72	13.5	<4	<4	<50	<50	156	188	2.46	2.9
28/03/2023	13.4	9.6	<4	<4	<50	<50	7,740	5,930	<0.8	3.14
14/02/2023	6.94	12.9	<4	<4	<50	<50	350	412	<0.8	<0.8
24/01/2023	15.2	17.8	<4	<4	<50	<50	4,740	5,860	<0.8	1.62

Produced water sampling and analysis continued…..

Sample Date	Mg_F	Mg_T	Mn_F	Mn_T	Mo_F	Mo_T	Pb_F	Pb_T	Ni_F	Ni_T
	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
Trigger Value										
Limit			80	80						
22/01/2024	41,000	41,000	99	85	<2	<2	<2	<2	6.4	6.1
15/12/2023	67,000	70,000	22	22	<2	<2	<2	<2	5	5.9
7/11/2023	110,000	150,000	110	120	<2	<2	<2	<2	2.1	2
15/10/2023			240	240						
12/09/2023	140,000	140,000	280	280	<2	<2	<2	<2	2.9	3.6
5/08/2023		120,000	29	30	<2	<2	<2	<2	2.2	3.3
16/07/2023	0	110,000	100	140	1.3	1.5	<1	<1	5.4	2.3
19/06/2023		260,000	280	270	<2	<2	<2	<2	<2	2.7
14/05/2023	61	56	26	28	<1	<1	<1	<1	3	3
16/04/2023	45,400	45,900	5.7	6.6	<2	<2	0.73	0.7	5.48	7.7
28/03/2023	67,300	65,800	41.4	47.5	<2	<2	<0.4	<0.4	4.46	2.14
14/02/2023	68,400	72,400	41.4	47.5	<2	<2	1.58	1.91	0.86	2.24
24/01/2023	99,800	97,500	145	163	<2	<2	0.69	0.82	1.66	3.23

Produced water sampling and analysis continued…..

Sample Date	Se_F	Se_T	Sn_F	Sn_T	Zn_F	Zn_T	Radium Isotopes (Ra 226)	Radium Isotopes (Ra 228)	MBAS	Phenol
	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	mBq/L	mBq/L	µg/L	µg/L
Trigger Value					23	23				
Limit					43	43				1200
22/01/2024	<2	<2	17	2.4	59	42				180
15/12/2023	<2	<2	<2	<2	40	120				110
7/11/2023	2.3	2.5	<2	<2	42	49				78
15/10/2023					55	49				150
12/09/2023	2.2	2.2	<2	<2	58	62				210
5/08/2023	<2	<2	<2	<2	45	51				
16/07/2023	1.1	<1	<1	<1	36	39			<0.1	190
19/06/2023	<2	<2	<2	<2	31	42			<0.1	140
14/05/2023	<1	<1	<1	<1	70	74			<0.1	92
16/04/2023	<8	<8	<4	<4	29.9	32.9			<0.1	110
28/03/2023	<8	<8	<4	<4	33.5	31.7			<0.1	110
14/02/2023	<8	<8	6.7	7	12.2	68.2			<0.1	110
24/01/2023	<8	<8	<4	<4	70.8	78.1			<0.1	110

Produced water sampling and analysis continued…..

Sample Date	Pentachlorophenol	2-Chlorophenol	2-Methylphenol (O-Cresol)	4-Methylphenol	2-Nitrophenol	Ethyl/Dimethylphenols	Benzoic acid	2,4-Dichlorophenol	2,6-Dichlorophenol	4-Chloro-3-Methylphenol
	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
Trigger Value										
Limit	55									
22/01/2024	<5.0	<20	220	200	<20	650		<20	<20	<100
15/12/2023	<5.0	<10	180	170	<10	250		<10	<10	<50
7/11/2023										
15/10/2023										
12/09/2023	<5	<1	330	240	<1	380		<1	<1	<5
5/08/2023										
16/07/2023	<50	<10	280	200	<10	310		<10	<10	<50
19/06/2023	<5	<1	260	200	<1	270		<1	<1	<5
14/05/2023	<50	<10	160	96	<10	<10		<10	<10	<50
16/04/2023	<50	<10	200	120	<10	330		<10	<10	<50
28/03/2023	<50	<10	180	270	<10	190		<10	<10	<50
14/02/2023	<5	<1	200	120	<1	290		<1	<1	<5
24/01/2023	<5	<1	220	130	<1	330		<1	<1	<5

These samples are only required Quarterly as NTEPL230-01.

Produced water sampling and analysis continued…..

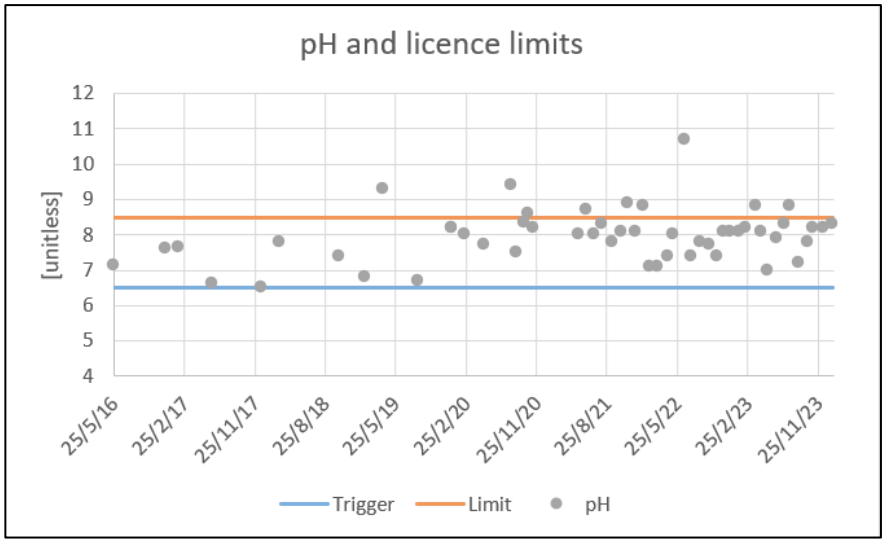
Sample Date	2,4,6-Trichlorophenol	2,4,5-Trichloro-phenol	2,4-Dinitrophenol	4-Nitrophenol	2,3,4,5-Tetrachlo-rophenol	2,3,4,6-Tetrachlo-rophenol	4,6-Dinitro-o-cresol	TPH	PAH
	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	mg/L	µg/L
Trigger									
Limit									
22/01/2024	<20	<20	<400	<20	<2.0	<2.0	<20		71
15/12/2023	<10	<10	<200	<20	<2	<2	<2		13
7/11/2023								4	14
15/10/2023								5.5	66
12/09/2023	<1	<1	<20	<20	<0.4	<0.4	<20	67.9	35
5/08/2023								0.43	28
16/07/2023	<10	<10	<200	<200	<4	<4	<200	2.4	44
19/06/2023	<1	<1	<20	<20	<0.4	<0.4	<20	0.1	22
14/05/2023	<10	<10	<200	<200	<100	<10	<100	0.15	4.3
16/04/2023	<10	<10	<200	<200		<10	<100	0.35	14
28/03/2023	<10	<10	<200	<200		<10	<100	4.75	25
14/02/2023	<1	<1	<20	<20	<10	<1	<10	0.84	26
24/01/2023	<1	<1	<20	<20	<10	<1	<10	3.35	20

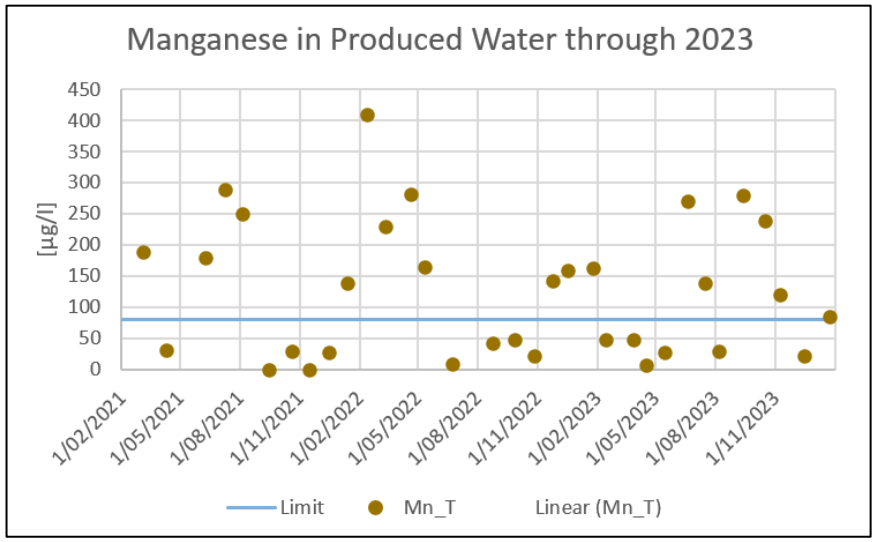
All samples, except TPH and PAH are required Quarterly.
TPH and PAH are required Monthly. As has been previously discussed with the NT EPA, the TPH and OiW sampling definition has been misunderstood. Since November 2022 Eni has taken samples for TPH analysis.

Produced water sampling and analysis continued…..

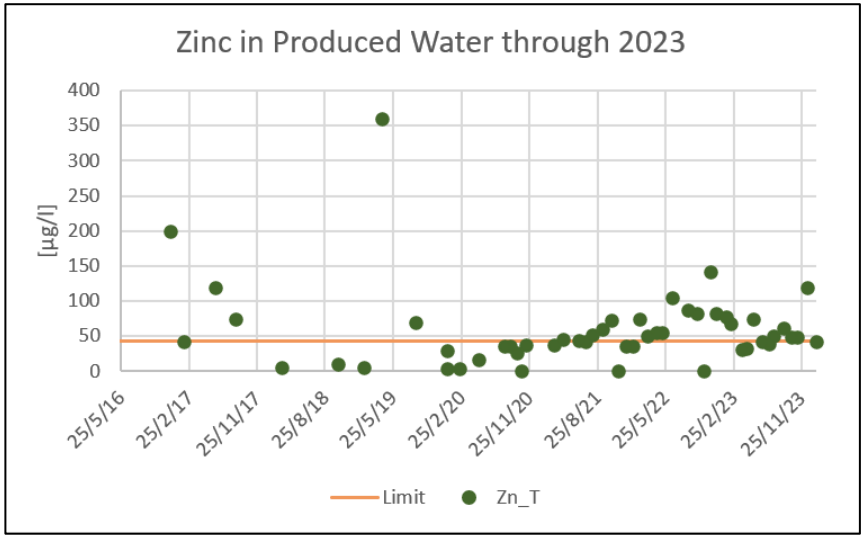
Sample Date	Benzene	Toluene	Ethyl benzene	Xylene (m+p)	Naphthalene	Anthracene	Fluoranthene	Benzo (a) pyrene	Xylene (O)
	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
Trigger	1300								
Limit	2000	330	160	150	120	7	2	0.7	
22/01/2024	800	2400	200	840	65	<0.1	<0.5	<0.1	320
15/12/2023	450	680	41	320	12	<0.1	<0.1	<0.1	120
7/11/2023	740	1800	140	540	<20	<0.1	<0.1	<0.1	220
15/10/2023	1400	3000	220	1000	28	<0.1	<0.1	<0.1	380
12/09/2023	380	1100	100	410	32	<0.1	<0.1	1	170
5/08/2023	420	980	97	420	26	<0.1	<0.1	<0.5	180
16/07/2023	1300	4200	440	1900	51	<0.5	<0.2	<0.1	660
19/06/2023	770	1900	190	780	25	<0.1	<0.1	<0.1	300
14/05/2023	360	570	51	210	12	<1	<1	<1	77
16/04/2023	530	1100	120	470	180	<10	<10	<10	180
28/03/2023	1400	3800	570	2300	48	<10	<10	<10	670
14/02/2023	1700	3900	480	1900	40	<1	<1	<1	640
24/01/2023	750	2000	230	980	34	<1	<1	<1	340

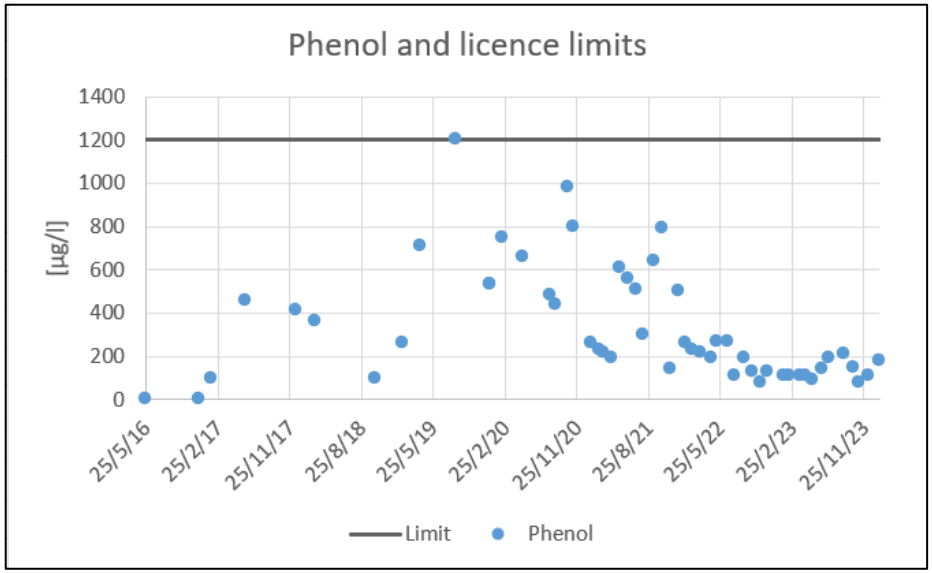
Produced water sampling and analysis continued…..

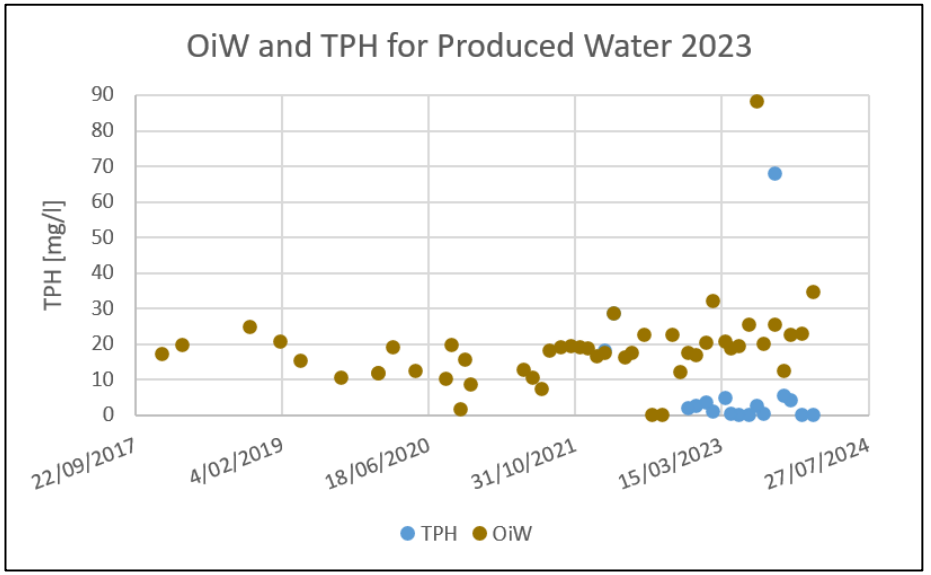




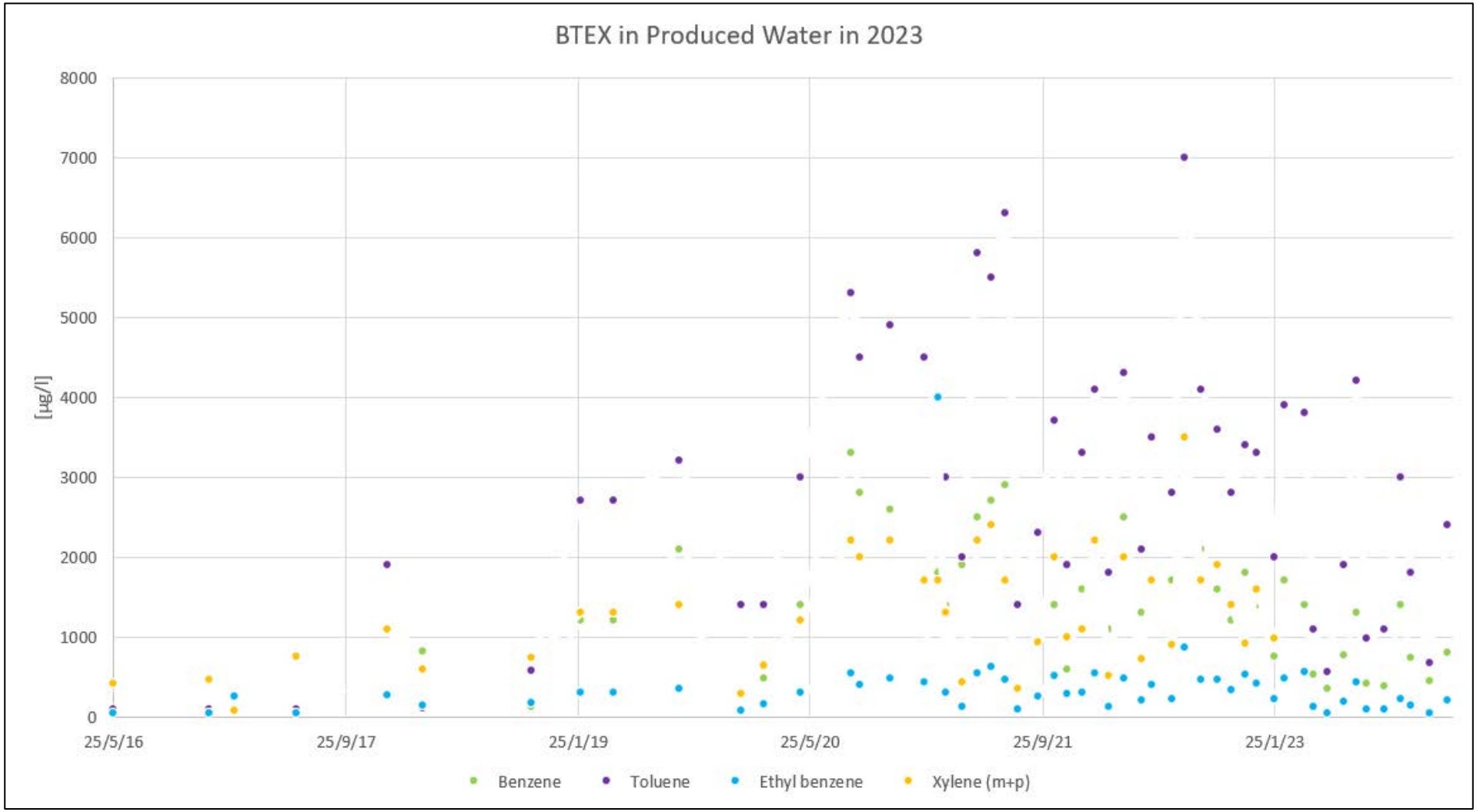
Units - pH : unitless, Manganese and Zinc : µg/L. Phenol : µg/L, OiW : mg/l, TPH : µg/L







Units - pH : unitless, Manganese and Zinc : µg/L. Phenol : µg/L, OiW : mg/l, TPH : µg/L



Units - BTEX : µg/L

ATTACHMENT C:

WWTP SAMPLING

Treated wastewater effluent monitoring results

Sample Date	pH	Elec Cond	Turbidity	DO	BOD	COD	TSS	TDS	TOC	OiW
Units	unitless	µS/cm	NTU	% sat	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l
Threshold	6.5 -8.5				10		10			6
Limits					20		30			10
17/01/2024	7.3	330	4.6	7.4	12	89	22	170	<1.0	3.9
15/12/2023										
8/11/2023	6.8				<5	130	71	1900	44	5.3
11/10/2023	7.4				<5	29	16	600	10	3.8
13/09/2023	8.1	1,200	5.8	10	<5	30	13	310	11	10.7
15/08/2023	7	760	5	3	97	320	11	450	48	4.9
13/07/2023	7	950	14	8.8	28	120	20	520	22	7.5
15/06/2023	7.3	1,300	6.4	10	<5	56	31	730	22	7.6
17/05/2023	5	1,100	4.8	7.8	20	220	10	600	17	12.8
12/04/2023	7	810	120	<1	62	620	180	330	36	7.8
28/03/2023	6.7	1,020	19	8	13	40	50	510	14	15.9
15/02/2023	6.6	1,180	5	9	6.4	40	10	670	14	8.8

Treated wastewater effluent monitoring results continued…

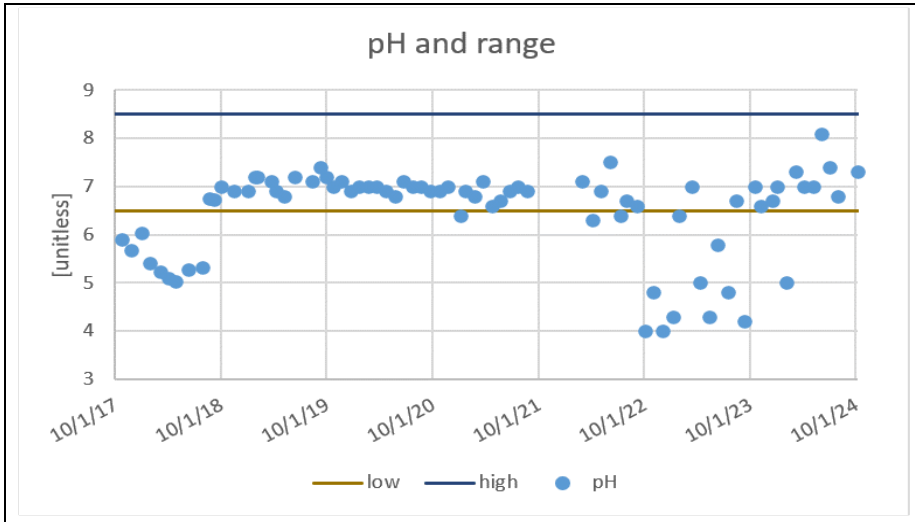
Sample Date	Tot. Phos	Tot. Dissolv Phos	Tot. Nitro	Tot. Dissolv Nitro	Ammon. N	Nox-N (Oxid. N)	NO3-N (nitrate)	NO2-N (nitrite)	E.Coli	Ent Cocci	Total Coliforms
Units	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	cfu per100ml	cfu per 100ml	
Threshold									100		
Limits									1000		
17/01/2024	0.71	0.22	13	11	8	2.2	2.2	0.029	2300	720	86000
15/12/2023											
8/11/2023	2.8	0.33	30	28	1				<10	<10	
11/10/2023	1	0.59	8.1	7.8	0.7				<10	40	
13/09/2023	1.4	0.95	11	11	2.5	4.9	4.8	0.14	<10	780	
15/08/2023	3.8	0.74	28	20	3.1	14	14	0.13	<10	430	
13/07/2023	1.5	0.32	19		5.5	7	6.9	0.067	<10	<10	10
15/06/2023	1.3	0.24	8.5	6.7	0.012	5.6	5.6	<0.005	<10	<10	<10
17/05/2023	0.4		58		21	35	35	0.24	10	<10	250
12/04/2023	8.95	1.22	38.9	26.2	22.9	0.06	0.055	<0.005	4,220	4,220	4,220
28/03/2023	0.245		37.7		12.7	4.05	4.02	0.035	13	2,420	2,420
15/02/2023	0.455		9.82		0.86	7.13	7.13	<0.005	1	53	

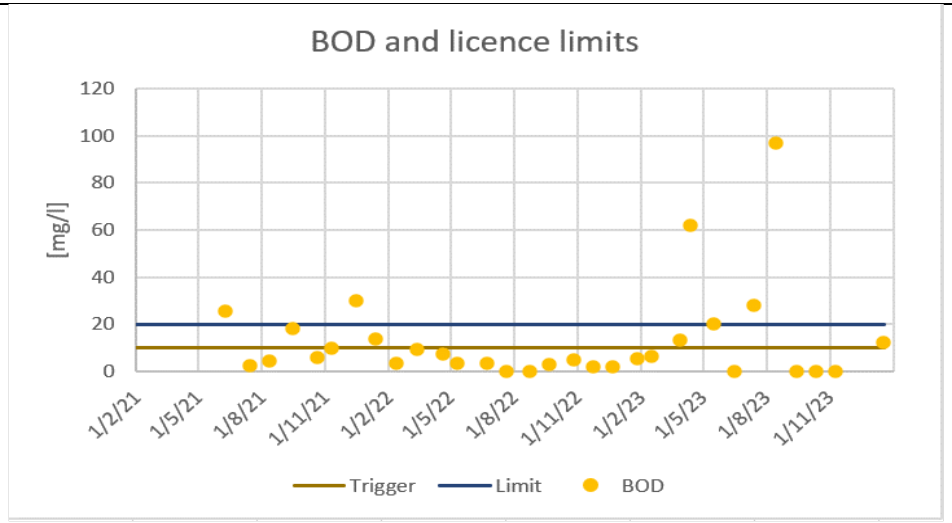
Treated wastewater effluent monitoring results continued…

Sample Date	Al	As	Ba	Be	B	Cd	Co	Cu	Cr	Cr III	Cr VI	Fe	Hg	M	Mn	Mo	Pb	Ni	Se	Sn	Zn
Units	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/	µg/L	µ	µg/	µg/	µg/	µg	µg/	µg	µg/L
Threshold																					
Limits																					43
17/01/2024																					
15/12/2023																					
8/11/2023																					
11/10/2023																					
13/09/2023																					
15/08/2023	61	1.2	7	<0.5	250	0.43	<1	14	<1	<5	<5	<10	<0.05		110	1	<1	6.7	<1	<1	120
13/07/2023																					
15/06/2023																					
17/05/2023																					
12/04/2023																					
28/03/2023																					
15/02/2023																					

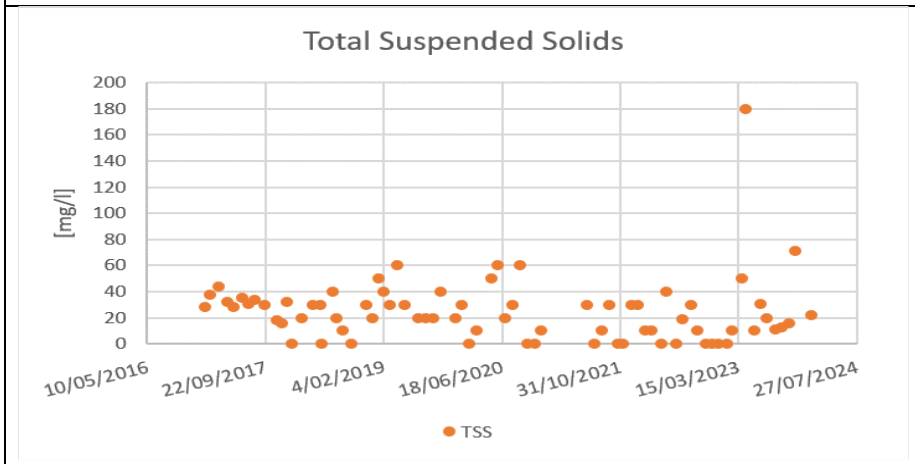
Treated wastewater effluent monitoring results continued…

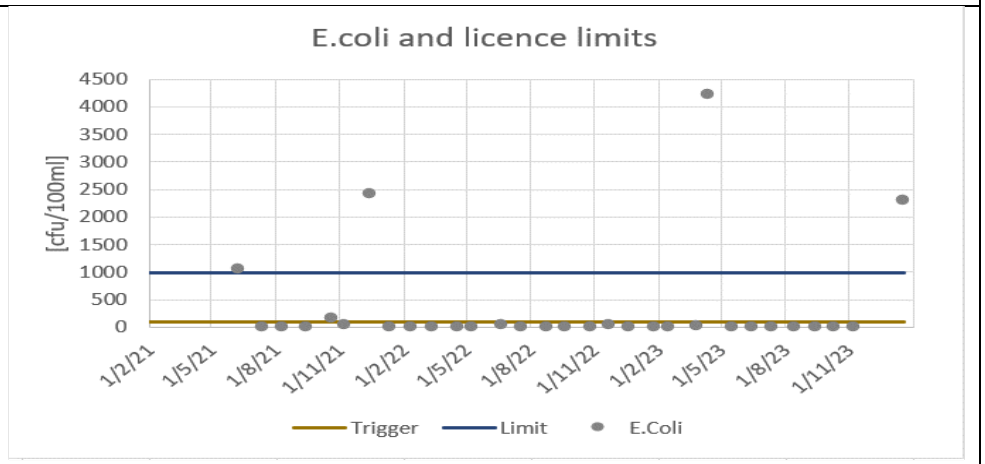
Sample Date	TPH	PAH	Benzene	Toluene	Ethyl benzene	Xylene (m+p)	Naphthalene	Anthracene	Fluoranthene	Benzo (a) pyrene	Xylene (o)
Units	mg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	
Threshold											
Limits			2000	330	160	150	120	7	2		
17/01/2024		<0.1	<1.0	1.2	<1.0	<2.0	<1.0	<0.1	<0.1	<0.1	<0.1
15/12/2023											
8/11/2023	<0.1	<0.1	<5	<5	<5	<10	<5	<0.1	<0.1	<0.1	<5
11/10/2023											
13/09/2023	1.4	<0.1	<1	<1	<1	<2	<1	<0.1	<0.1	<0.1	<1
15/08/2023	<0.1	<0.1	<1	<1	<1	<2	<1	<0.1	<0.1	<0.5	<1
13/07/2023	0.19	<0.1	<1	<1	<1	<2	<0.1	<0.1	<0.1	<0.1	<1
15/06/2023	0.29	<0.1	<1	<1	<1	<2	<0.1	<0.1	<0.1	<0.1	<1
17/05/2023	TBA	0	<1	<1	<1	<2	<1	<0.1	<0.1	<0.1	<1
12/04/2023	0.25	0	<1	<1	<1	<2	<1	<1	<1	<5	
28/03/2023	<0.1		<1	1	<1	<2	<2	<1	<1	<1	<1
15/02/2023	0.24	0	<1	2	<1	<2	<1	<1	<1	<1	<1

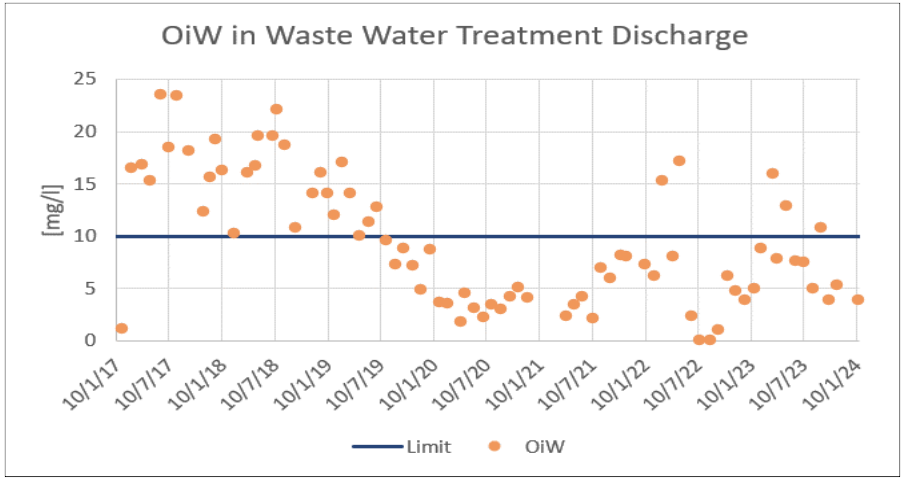


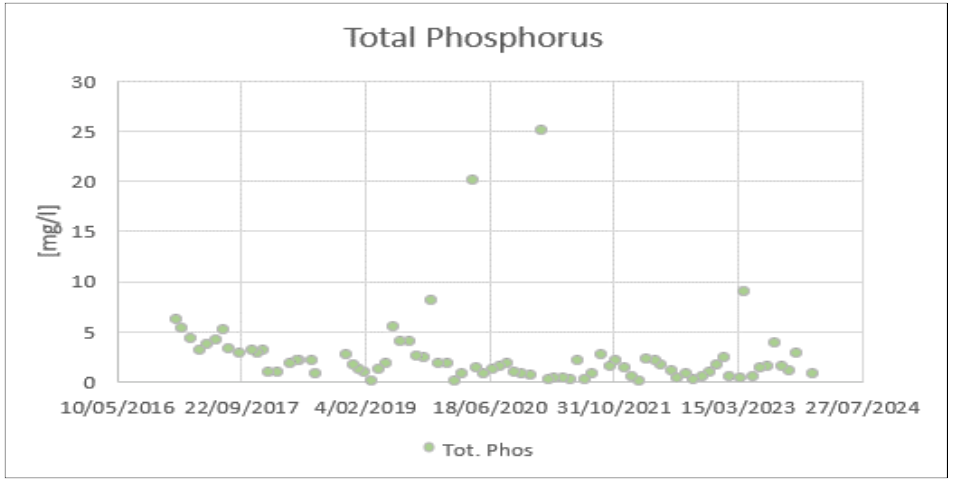


Units – pH : Unitless, BOD : mg/l, TSS : mg/l, E.Coli : cfu/100ml,

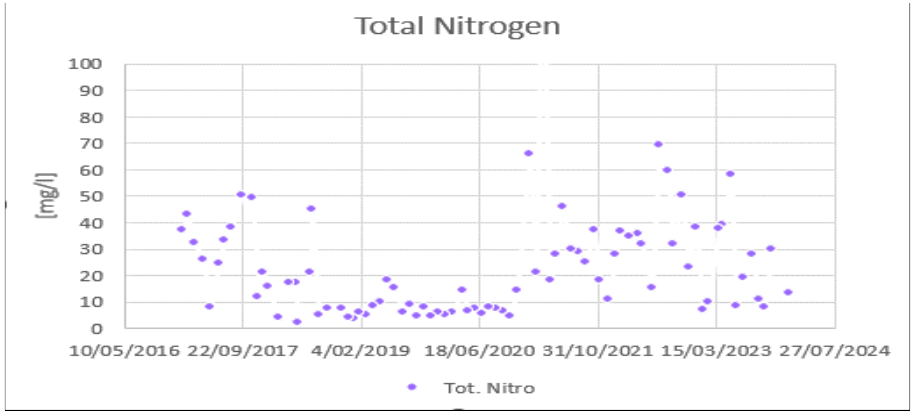


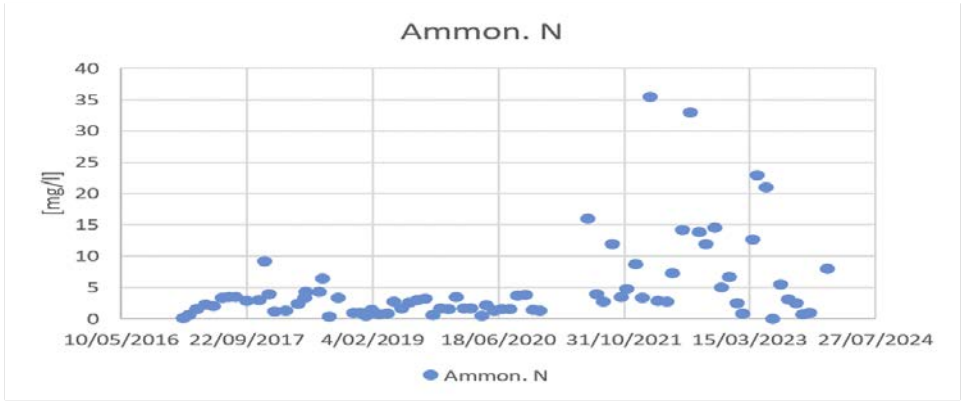






Units – OiW : mg/l, Total Phosphorus : mg/l, Total Nitrogen : mg/l, Total Ammonia : mg/l





ATTACHMENT D:

STORMWATER MONITORING

Utilities stormwater discharge monitoring (SW-01)

Date & time	pH	EC	Oil in Water (HORIBA)
	pH	µs/cm	mg/L
Trigger			1
Limit			6
4/3/2023	5.98	87	1.9
3/04/2023	5.9	-	-
2/05/2023	6.12	-	2.7
11/06/2023	6.19	86	0.7
26/07/2023	5.51	184.5	0.9
27/07/2023	5.69	131.5	0.5
7/09/2023	5.74	149.8	0.4

Table – Site measurements during discharge

Open drains sump stormwater discharge monitoring (SW-03)

Date & Time	pH	EC	Oil in Water (HORIBA)
	pH	µs/cm	mg/L
Trigger			1
Limit	-	-	6
23/02/2023	6.8	-	1.2
25/03/2023	6.32	-	0.8
15/04/2023	6.93	558.1	0.5
9/07/2023	7.337	9.371	0.8
01/10/2023	7.08	3.35	4.1
13/11/2023	6.55	1.53	1.5
20/11/2023	6.538	1.633	4.8
10/12/2023	-	-	0.9

Notes:

[4] Values above the EPL limit are shown in red text. Values above the trigger value or outside ANZECC 80% species protection guideline value are shown in orange text.
[5] All routine analyses conducted in the site laboratory, using the PC700 bench meter for pH and EC, and the Horiba OCMA500 with Florisil solvent for oil in water, unless otherwise stated

Annual stormwater monitoring

Parameter	Unit	Value
pH	unitless	6.7
Elec Cond	µS/cm	67
OiW	mg/l	3.6
Al	µg/L	32
As	µg/L	<1
Ba	µg/L	170
Be	µg/L	<0.5
B	µg/L	36
Cd	µg/L	4.4
Co	µg/L	<1
Cu	µg/L	<1
Cr	µg/L	<1
Cr III	µg/L	<0.5
Cr VI	µg/L	<0.5
Fe	µg/L	180
Hg	µg/L	<0.050
Mg	µg/L	<500
Mn	µg/L	12
Mo	µg/L	1.5
Pb	µg/L	<1
Ni	µg/L	4.4
Se	µg/L	<1
Sn	µg/L	<1
Zn	µg/L	94

Notes:

[1] This table summarises the discharge monitoring between 10 February 2023 – 9 February 2023.

[2] NT = not tested.

[3] Trigger value for 80% species protection from the Australian and New Zealand Guidelines for Fresh and Marine Water Quality, Volume 1. Updated values (2018) have been used where available.

[4] Values above the EPL limit are shown in red text. Values above the trigger value or outside ANZECC 80% species protection guideline value are shown in orange text.

[5] All routine analyses conducted in the site laboratory.

Sample Date	pH	Elec Cond	OiW	Al	As	Ba	Be	B	Cd	Co	Cu	Cr	Cr III	Cr VI
	unitless	µS/cm	mg/l	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
21/01/2024	6.7	67	3.6	32	<1	170	<0.5	36	4.4	<1.0	<1.0	<1.0	<0.5	<0.5
12/09/2023	7.4	350	17.7	42	1.3	250	<0.5	190	0.16	<1.0	<1.0	<1.0	<0.5	<0.5
13/02/2023	7.0	543	9.0	4.5	0.3	896	<0.5	33.5	0.12	0.18	0.63	0.2	<0.5	<0.5

Sample Date	Fe	Hg	Mg	Mn	Mo	Pb	Ni	Se	Sn	Zn
	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
21/01/2024	180	<0.050	<500	12	<1	<1.0	4.4	<1.0	<1.0	530
12/09/2023	2000	<0.050	840	74	13	<1.0	23	<1.0	<1.0	42
13/02/2023	8	<0.020	1.5	49.1	1.3	0.13	3.99	<0.2	<1.0	94

Stormwater outlet- SW-01- Annual Laboratory analysis results - Intertek

ATTACHMENT E:

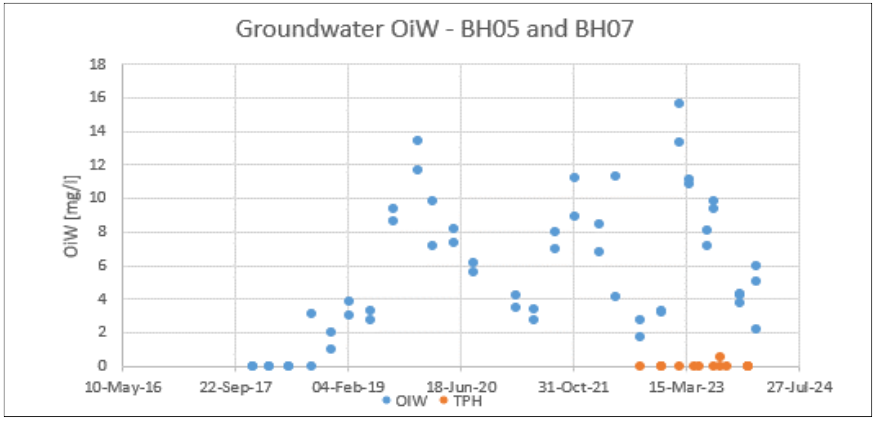
GROUNDWATER MONITORING

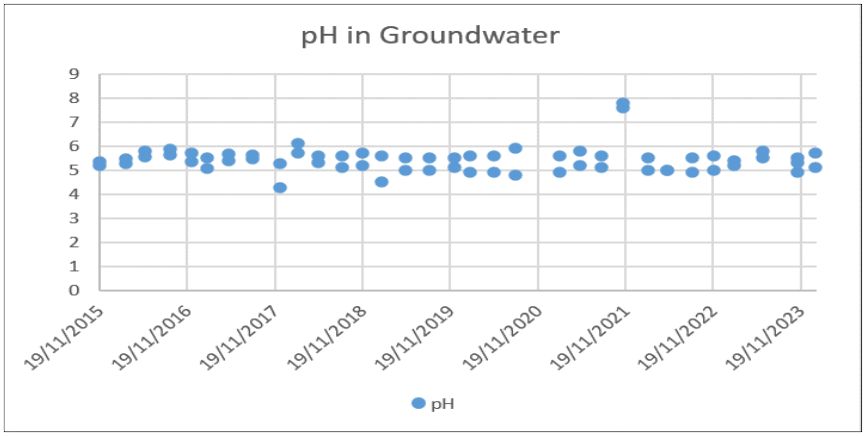
Quarterly groundwater monitoring data

Sample Date		pH	E Cond	Turbidity	DO	BOD	Total Phos	Total Nitro	NOx (Oxid. N)	NH3 (Amm)	NO3 (Nitrate)	NO2 (Nitrite)
		-	microS/cm	NTU	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
21/01/24	BH-01	5.3	260	78	6.5							
21/01/24	BH-05	5.1	71	1.4	7.3							
21/01/24	BH-07	5.7	44	6.1	8							
7/11/23	BH-01	5.3	260	110	11	<5	<0.05	0.43	0.15	<0.005	0.15	<0.005
7/11/23	BH-05	4.9	89	180	11	<5	<0.05	3.2	2.8	0.066	2.8	<0.005
7/11/23	BH-07	5.5	44	320	11	12	<0.05	1.9	1.8	<0.005	1.8	<0.005
13/07/23	BH-05					20	<0.05	3.7	3.5	0.019	3.5	<0.005
13/07/23	BH-07					11	<0.05	2.5	2.2	0.017	2.2	<0.005
15/06/23	BH-05	5.5	56	31	HT breach	14	<0.05	3.7	3.1	0.016	3.1	<0.005
15/06/23	BH-07	5.8	42	68	HT breach	<5	<0.05	2.6	2.2	0.015	2.1	<0.005
15/05/23	BH-05											
15/05/23	BH-07											
18/04/23	BH-05											
18/04/23	BH-07											
27/03/23	BH-05											
27/03/23	BH-07											
13/02/23	BH-05	5.2	68	56	21	6.5	0.025	4.19	3	0.02	3	<0.005
13/02/23	BH-07	5.4	71	100	90	7	0.085	3.51	3	0.05	3	<0.005

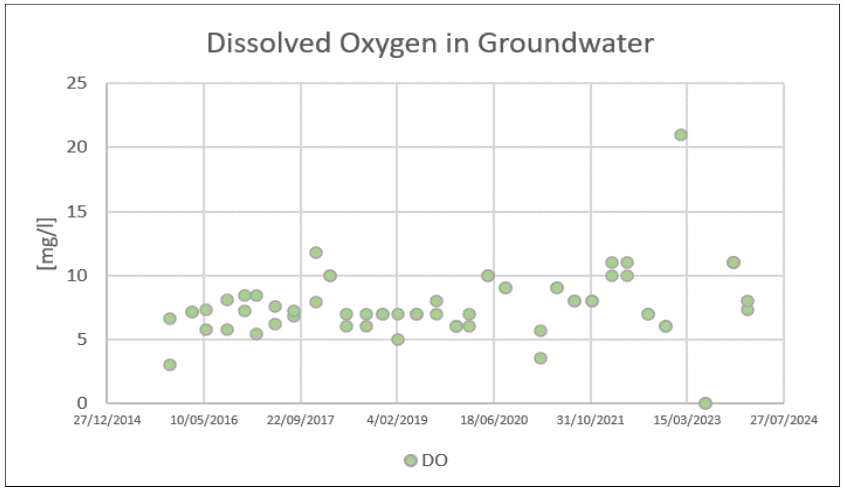
Quarterly groundwater monitoring data

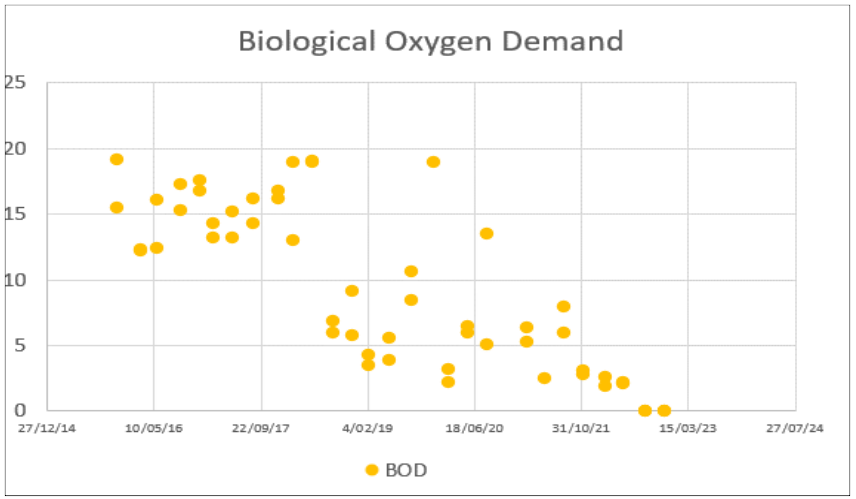
Sample Date	E. coli	Ent-Cocci	Total Coliforms	TPH	OIW	TSS	TDS	TOC	COD
	cfu per 100ml	cfu per 100ml	per 100ml MPN	µg/L	mg/L	mg/L	mg/L	mg/L	mg/L
21/01/2024				<0.1	6				
21/01/2024				<0.1	5				
21/01/2024				<0.1	2.2				
7/11/23	<10	<10	<10	<0.1	4.3	110	65	1.8	20
7/11/23	<10	<10	<10	<0.1	3.7	230	51	1.6	25
7/11/23	<10	<10	<10	<0.1	4.2	220	39	5.5	220
13/07/23	<10	<10	<10	<0.1	9.8	320	30	1.4	74
13/07/23	<10	<10	10	<0.1	9.4	580	48	1.3	85
15/06/23	<10	<10	<10	0.49	7.2	110	42	1.2	<20
15/06/23	<10	<10	10	<0.1	8.1	320	35	<1	52
15/05/23									
15/05/23									
18/04/23	3	<1	>2419.9						
18/04/23	1	<1	1990						
27/03/23	<1	<1	<1	<0.1	10.8				
27/03/23	<1	<1	<1	<0.1	11.1				
13/02/23	<1	260	56		13.3	30	50	<1	<20
13/02/23	1	461	517		15.6	160	60	<1	<20

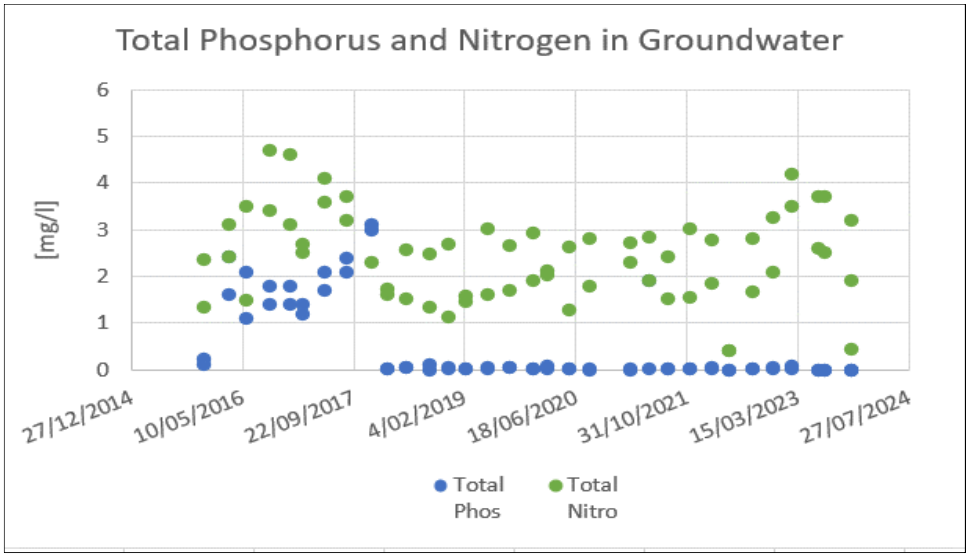


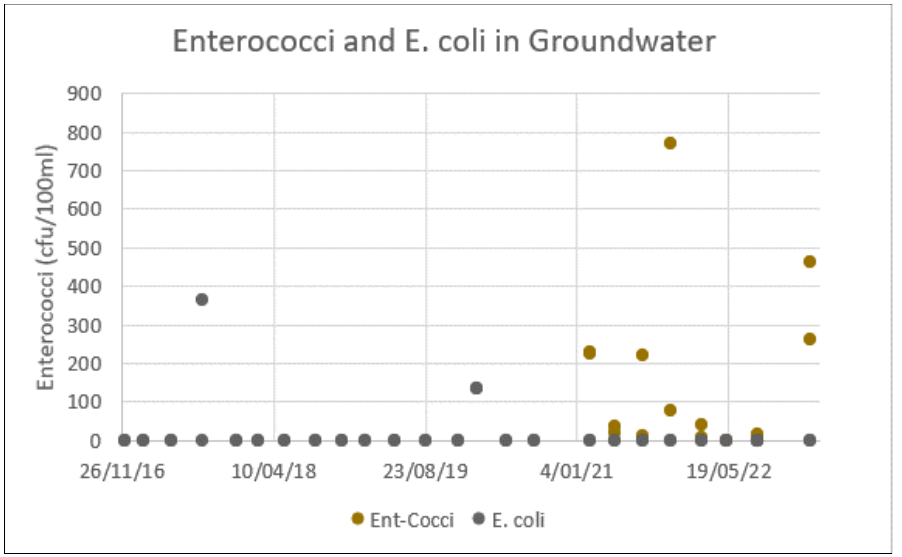


Units – OiW : mg/l, TPH : µg/L, pH : unitless, DO : mg/l, BOD : mg/l









ATTACHMENT F:

CALIBRATION CERTIFICATES

intertek
Total Quality. Assured.

VERIFICATION REPORT

Client: ENI Australia, Blacktip YGP
Instrument: HORIBA OCMA-500
Serial Number: T9EHWHDT
Date Calibrated: 10th February 2024
Next Calibration: 10th August 2024

Method

1. Zero Calibration
   a. Pure S-316 Solvent is measured in measurement mode, and result should be 0.0 mg/L if not replace internal filters and re measure.
   b. Change instrument into Zero Calibration and run S-316 Solvent.
2. Span Calibration
   a. Prepared known sock sample is measured to obtain steady reading. Concentration of standard is twice the value of measured sample.
3. Verify with Standard or Stock Samples.

Maintenance:

Were Internal Filter / O-ring replaced : Yes
Were repairs carried out : No

Calibration Results:
Following readings were obtained against Pure S-316 & Standard.

Mode	Expected Reading (mg/L)	Instrument Reading (mg/L)
Zero Calibration	0.0	0.0
Span Calibration	200.0	200.0
Stock Sample 1	50.0	50.3
Stock Sample 2	25.0	24.1

Remarks:
The Instrument is acceptable for use as per the standard operating test procedure (ASTM D 7066).

Verified by: Pasan Mihijaya
Title: Chemist
Date: 10th February 2024

intertek caleb brett

Page 1 of 1

Other calibration certificates of third party laboratories are assumes to be incorporated by NATA accreditation. Certificates may be requested.