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Interim Environmental Audit Report

Yelcherr Gas Plant, Northern Territory

15 June 2023

Document Information

Interim Environmental Audit Report
Yelcherr Gas Plant, Northern Territory

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Revision	Date	Author	Reviewed	Approved	Detail
Draft A	23 March 2023	Ashton Betti	Jason Clay	Jason Clay	Draft for client review
Rev0	15 June 2023	Ashton Betti	Jason Clay	Jason Clay	Final

Project Manager: Ashton Betti

Project Director: Jason Clay

Senversa acknowledges the traditional custodians of the land on which this work was created and pay our respect to Elders past and present.

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List of Acronyms

Acronym	Definition
AFFF	Aqueous Film Forming Foams
bgl	Below Ground Level
BOD	Biological Oxygen Demand
BTEXN	Benzene, Toluene, Ethylbenzene, Xylenes and Naphthalene
DAT	Demand Aeration Tank
DO	Dissolved Oxygen
EC	Electrical Conductivity
EMP	Environmental Management Plan
EPL	Environment Protection Licence
LP	Low Pressure
MP	Medium Pressure
NATA	National Association of Testing Authorities

Acronym	Definition
NEPM	National Environment Protection (Assessment of Site Contamination) Measure
NT EPA	Northern Territory Environment Protection Authority
OIW	Oil in Water
PFAS	Per- and Polyfluoroalkyl Substances
PFW	Produced Formation Water
QA	Quality Assurance
QC	Quality Control
SAQP	Sampling and Analysis Quality Plan
SPM	Single Point Mooring
TPH	Total Petroleum Hydrocarbons
TSS	Total Suspended Solids
YGP	Yelcherr Gas Plant

1.0 Introduction

1.1 Background

Senversa Pty Ltd was engaged by Bureau Veritas Asset Integrity and Reliability Pty Ltd on behalf of Eni Australia Pty Ltd (Eni) to conduct an environmental audit of certain aspects of the operation of the Yelcherr Gas Plant (YGP) in response to a "Notice to Carry Out Environmental Audit Program" (hereafter referred to as 'the Notice') issued by the Northern Territory Environment Protection Authority (NT EPA) on 14 October 2022.

The YGP is regulated under an Environment Protection Licence (EPL) (EPL230-01) issued pursuant to the *Waste Management and Pollution Control Act 1998*.

As a result of non-compliances with the EPL, the Notice was issued pursuant to Section 48(1) of the *Waste Management and Pollution Control Act 1998*. The Notice identified that the key purpose of the environmental audit is to evaluate:

a) *"the ability of management systems at the Yelcherr Gas Plant to manage waste or prevent, reduce, control, rectify or clean up pollution or environmental harm resulting from pollution*

b) *the extent, nature and source of wastes generated by the Yelcherr Gas Plant (i.e. an activity, premises or process); and*

c) *the types, amount, distribution and mobility of contaminants and wastes present in the environment at and from the Yelcherr Gas Plant."*

1.2 Audit Objectives

The objective of the environmental audit was to address the items identified within the Notice to the satisfaction of the NT EPA.

2.0 Scope of Audit

2.1 Appointed Auditor

The appointed auditor was Jason Clay, a state accredited Contaminated Site Auditor in WA and NSW and Certified Environmental Practitioner and Specialist in Contamination, and is considered suitably qualified in accordance with section 68 *Waste Management and Pollution Control Act 1998*. Jason is certified as a Principal Environmental Auditor under the Institute of Environment Management and Assessment's environmental auditors' registration scheme and has been for almost 20 years.

Jason was assisted by Ms Ashton Betti a Principal of Senversa based in Perth.

Details of the auditor team's qualifications and experience are included in **Appendix A**.

2.2 Audit Scope of Works

The audit was completed in a staged approach as follows.

2.2.1 Pre-Audit Activities

Available information, including the EPL was reviewed, and used to form the basis of an audit questionnaire that outlined the scope of work for the on-site component of the audit. This information was documented in *Yelcherr Gas Plant, Environmental Audit Program - Scope of Works*, dated 11 January 2023 (Reference: D20289_002_LET_11January2023).

The audit scope of works was accepted by NT EPA via email correspondence on 16 January 2023.

2.2.2 Site Inspection and Audit

The site inspection and audit were undertaken on 22 to 25 February 2023. The objective was for the audit team to gain an understand of site operations and infrastructure, review management systems and supporting documentation, interview relevant personnel and complete the audit questionnaire.

The site inspection and audit included a review of systems, plans, procedures, monitoring programs, data, records, reports and information as considered relevant to the audit. The site inspection and audit also assessed activities, processes, plant and equipment at the premises and interviewed a number of staff members. No independent data collection or verification was completed as part of this stage of the audit.

Interviews were completed with the following personnel:

- Mark Easterbrook – Senior Environmental Advisor.
- Kenny Bishell – On-site Production Operations Supervisor.
- Shafariee Sulaiman – On-site HSE Coordinator.
- Jay Reid – On-site Logistics Coordinator.

During the site inspection and audit, compliance with EPL230-01 licence conditions in relation to potential environmental harm were assessed and documented in the audit checklist presented in **Appendix B**.

2.2.3 Interim Environmental Audit Report

An Interim Environmental Audit Report was prepared for submission to NT EPA (reported herein).

This report responds directly to the issues at hand raised in the Notice, primarily regarding an assessment of the actual and potential risk of environmental harm from activities conducted at the premises.

This report summarises the outcomes of the audit in terms of compliance performance and provides recommendations for improvement actions where necessary. The report also documents the proposed scope of work and methodology for intrusive investigation works that are recommended to resolve specific Notice requirements. This report has been prepared with due consideration of relevant guidelines and regulations.

2.2.4 Final Environmental Audit Report

A final report will be prepared for submission to NT EPA, which includes the results from the sampling program, as well as any feedback from NT EPA on the Interim Environmental Audit Report. This will outline the findings of the sampling exercise, it will discuss whether significant environmental impacts have occurred and if so make recommendations for their rectification.

This must be provided to NT EPA by no later than **16 October 2023**.

3.0 Relevant Documentation

3.1 Legislation and Guidelines

The audit was undertaken with reference to the following legislation and guidelines:

- *Waste Management and Pollution Control Act 1998*
- National Environment Protection Council (1999) *National Environment Protection (Assessment of Site Contamination) Measure 1999 (amended 2013)*
- NT EPA (2016) *Guideline for Reporting on Environmental Monitoring*. Version 1.0, May 2016.
- NT EPA (2017) *Northern Territory Contaminated Land Guideline*. Version 1.0, June 2017.
- National Environment Protection Council (2013) *National Environment Protection (Assessment of Site Contamination) Amendment Measure (No.1)*. This is hereafter referred to as 'ASC NEPM'.

3.2 Documents Reviewed

The following documents have been reviewed as part of this environmental audit:

- NT EPA Notice to Carry Out Environmental Audit Program (14 October 2022)
- Eni Australia (2022) Blacktip Annual Environmental Monitoring Report 2021. (Reference: 000036_DV_PR.HSE.1160.000) (10 March 2022)
- NT EPA Annual Return EPL230-01 for Reporting Period 10 February 2021 – 9 February 2022 (9 March 2022)
- NT EPA Environmental Protection Licence EPL230-01 (10 February 2020)
- Eni Australia (2017a) Produced Formation Water Plan for EPL57-02 Condition 43. (Reference: 000036_DV_PR.HSE.1056.000) (19 May 2017)
- Eni Australia (2017b) Blacktip Operations. Emergency Response Plan. (Reference: 000036_PR_EX.HSE.0675.000) (24 July 2017)
- Eni Australia (2010) Blacktip Operations. Onshore Gas Plant Environmental Management Plan. (Reference: 000036_DV_EX.HSE.0684.000) (29 November 2010)
- Eni Australia (2009) Blacktip Project. Flaring Management Plan. (Reference: 000036_DV_EX.HSE.0679.000_A01) (1 April 2009)

4.0 Site Operations

The YGP is situated on the traditional lands of the Yak Maninh and Yak Diminin people in the Thamarrurr Region, located near the community of Wadeye in the Northern Territory. The site occupies an area of 750 m x 750 m.

YGP receives natural gas from the offshore wellhead platform in the Bonaparte Gulf. The YGP commenced production on 26 August 2009 and has an expected operational life of 30 years.

The facility is currently regulated under EPL230-01, issued pursuant to the *Waste Management and Pollution Control Act 1998.* This permits the processing of a maximum of 1,055,300 tonnes of natural gas and 50,930 tonnes of condensate per annum.

The YGP comprises:

1. An onshore gas processing plant consisting of separation, gas dehydration, compression, condensate storage, ground flare, produced water treatment facilities and subsequent wastewater discharges;
2. A wastewater irrigation field, storm water infrastructure and groundwater monitoring bores;
3. An 18" carbon steel, multi-phase pipeline utilised for importing produced fluids from the offshore gas field;
4. A condensate offtake line from the condensate storage facilities to the Single Point Mooring (SPM) location offshore; and
5. A processed gas export pipeline and custody transfer meter located at the premises boundary.

The site processes are presented in **Figure 1**.

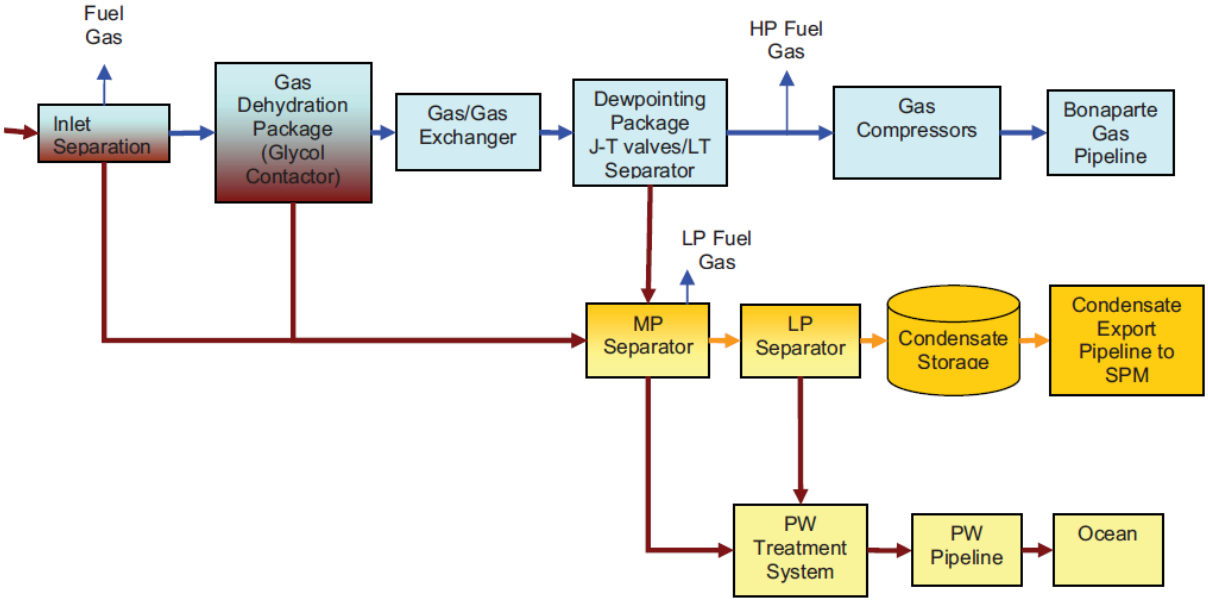


Figure 1: YGP Process Diagram
(from: Onshore Gas Plant Environmental Management Plan, 29 November 2010)

During the site audit gas processing operations, as shown in **Figure 1**, were described in detail by the On-site Production Operations Supervisor (Kenny Bishell). A high-level summary of operations, as relevant to the site audit, is provided as follows.

Produced fluids enter the site via a multiphase pipeline from the offshore gas field. Initial separation occurs via a slug catcher, which broadly separates into the following streams:

- Gas: Treated via glycol separation and low temperature separation prior to being piped to Darwin via the Bonaparte Gas Pipeline.
- Condensate + produced formation water (PFW): treated via the medium pressure (MP) separator into gas (returned to gas separators), condensate and PFW.
    - Condensate undergoes further treatment through a Low Pressure (LP) separator for stabilisation prior to being stored in two condensate tanks ready for export (total storage 45,000 barrels, approximately 7000 m^3). Condensate is pumped via an underground pipeline of approximately 2 km length to the SPM located approximately 2 km offshore for tanker export approximately twice per year. A floating hose pressure test is completed prior to offtake and condensate transfer volumes are recorded during transfer. Eni reported that intelligent pigging of the pipe most recently occurred in 2022, however this report has not been provided for review.
    - PFW is treated to attempt to remove free oil, prior to discharge using induced gas flotation, nitrogen induced flotation and skimmers. A detailed description of the PFW treatment system is provided in the Produced Formation Water Plan (Eni Australia 2017a). Due to the high oil in water (OIW) content of PFW caustic soda is manually added to raise the pH followed by downward pH adjustment using citric acid. CETCO filters (fitted with a PM10 and Oil Bond Filter) are also available to be added to PFW treatment when concentrations of OIW are high. PFW is discharged under EPL230-01 to the marine environment via discharge location PW-01, located approximately 2 km offshore and 12 m below the ocean surface. Due to the currently high quantity of PFW production, discharge is currently occurring on a daily basis.

      A third party, Contract Resources, attend site approximately biannually to clean sludge from PFW tank. During the most recent clean out, completed in February 2023, approximately 150 m^3 of sludge was removed from the PFW tank and disposed off-site (disposal receipts have not been provided for review).

Water supply for site operations (including ancillary buildings such as accommodation) is sourced from two production bores (PB2 and PB3) located in the north-western portion of the site. Field notes indicate that production bores were installed to a depth of 58-59 m below ground level (bgl). Water is pumped into a holding tank and treated with liquid chlorine (sterilisation) and bicarbonate (increase pH) prior to distribution around site. Daily testing of potable water occurs at the on-site laboratory (pH and chlorine) with samples submitted to an off-site laboratory for analysis on a monthly basis.

Wastewater from accommodation is piped to a Demand Aeration Tank (DAT) tank and treated with aluminium sulphate and chlorine prior to being sprinklered onto an irrigation field located in the eastern portion of the site.

Stormwater from the gas plant area is transported via drains to a hazardous water system, which comprises a triple interceptor trap, which discharges to grade at SW-03, located at the eastern part of the plant.

A firewater system is located to the north of the condensate tanks, with numerous hydrants located around the plant. Firewater is sourced from the on-site production bores. Aqueous film forming foams (AFFF) are stored in bunded 200 L drums located near a number of hydrants. At the time of the site inspection foam comprised Tridol AFT (3-6%). One 20 L drum of Ansulite was also identified within the dangerous good storage shed. It is understood that various foams have been used during operation of the plant. The fire system is tested regularly; however, all foams are disconnected prior to testing.

Firewater runoff occurs to grade at SW-02 (noting that the licenced sampling point for this discharge is SW-01). All fire training occurs at an off-site facility, with foam releases at the site only occurring during accidental set offs.

Diesel fuel storage on-site is within a 60,000 L above ground storage tank, which is supplied by road tankers. Diesel is used as a fuel for the emergency generator, fire pump and plant vehicles.

All other waste streams (oily water waste, oily sludge, cooking oil, scrap steel, waste batteries, fluorescent tubes, JetA1 [4 x 200 L drums replaced yearly], general waste) are transported off-site via barge to Darwin or to the local landfill facility located at Wadeye (kitchen waste only).

5.0 Audit Findings

5.1 Compliance Ratings

The compliance ratings used to record the level of compliance with the licence conditions at the time of the audit are summarised in **Table 5.1**.

Table 5.1: Compliance Status Descriptors

Rating	Compliance Status
Compliant	Where the auditor has collected sufficient verifiable evidence to demonstrate that the intent and all elements of the requirement of the licence have been complied with within the scope of the audit.
Partially Compliant	Where the auditor has collected sufficient verifiable evidence to demonstrate that the intent of one or more specific elements of the licence has been complied with within the scope of the audit, however where there are also some elements that have not been complied with.
Non-Compliant	Where the auditor has collected sufficient verifiable evidence to demonstrate that the intent of one or more specific elements of the regulatory approval has not been complied with within the scope of the audit.

5.2 Compliance with EPL230-01

An assessment of compliance with relevant EPL230-01 conditions is presented in **Appendix B**. A summary of the main findings and recommendations are presented in **Table 5.2**.

Table 5.2: Summary of Non-Compliances with Licence Conditions

Condition	Comment / Audit Finding	Recommendation
28	A number of parameters exceeded the licence limits at PW-02 (produced formation water) and WW-02 (treated wastewater effluent).	Further treatment of wastewater at these locations should occur prior to discharge to reduce potential risk of harm to receiving environments.
41	There are a number of instances where monitoring of wastewater discharge has not been in accordance with licence requirements. A number of the required analytes do not have Trigger Values or Limits.	Operational systems should be implemented to ensure that analysis occurs in accordance with licence requirements. EPL230-01 should be amended to reflect the updated sampling location for the firewater system (SW-02), as there is no flow at SW-01 during firewater testing due to the design of the system. Engagement with NT EPA regarding the required suite of analysis, given that there are no limits for a number of the required analytes and for others results have been consistently below detection and therefore not considered to be a relevant potential contaminant of concern. Furthermore per- and polyfluoroalkyl substances (PFAS) have not been included in the analytical suite but may be a potential contaminant of concern associated with firewater system. The EPA should be questioned as to the purpose and necessity of firewater runoff sampling and to reconsider the continuation of this monitoring. Assessment of OIW vs oil/grease laboratory analysis.

Condition	Comment / Audit Finding	Recommendation
42	There are a number of instances where monitoring of air emissions has not been in accordance with licence requirements.	Consider inline monitors to provide ongoing air emissions data rather than biannual monitoring.
43	There are a number of instances where groundwater monitoring has not been in accordance with licence requirements.	Operational systems should be implemented to ensure that analysis occurs in accordance with licence requirements. PFAS has not been included in the analytical suite but may be a potential contaminant of concern. An additional groundwater monitoring well location was identified (BH-01) which should be considered for inclusion in sampling program, if appropriate (see recommendations for further samples presented in **Section 5.4**).
44	The current monitoring regime is not considered to be effective in assessing the risk to marine ecosystems.	The Produced Formation Water Plan should be updated with a revised monitoring strategy which should include some monitoring at discharge location (PW-01) and nearby sensitive environment (Walpinhthi Reef) or conditions 44 and 65 should be renegotiated with the NT EPA.
46	Groundwater sampling techniques are not considered to enable collection of representative samples (samples collected using a reusable bailer without any purging).	The Eni sampling plan needs updating in accordance with current industry standards. This should include: • Production of an updated Environmental Management Plan (EMP) with a Sampling and Analysis Quality Plan (SAQP) as an annex. • Appropriate training of samplers to ensure representative samples are being collected. In line with NT EPA sample expectations. • Samples are scheduled for timely and cost-effective analysis at a NATA accredited laboratory. • Data are returned in ESDAT format (or similar) for ease of identification of non-conformances.
47	Deviations from Australian Standards and guidelines for sample collection were identified, including absence of quality control samples.	As above, the Eni sampling plan needs updating in accordance with current industry standards. This should include appropriate training of samplers to ensure representative samples are being collected.
48	A number of analysis methods were not National Association of Testing Authorities (NATA) accredited and there was an absence of supporting laboratory quality control documentation provided by laboratories.	Eni should use different environmental laboratories that are NATA accredited for analysis.
50	Sampling is completed by in-house operators who have not been trained in environmental sampling methods.	Samplers should be trained in the correct sampling methods to ensure that appropriately representative samples are collected.
57	There are a number of instances where non-compliances of licence conditions have not been reported to NT EPA in a reasonable timeframe. There have been more than 4 week delays on the provision of laboratory results.	Eni should use different environmental laboratories that are NATA accredited for analysis.
64.5	Data interpretation has not been included in the Annual Monitoring Report.	The report structure should be updated to include data interpretation and trend analysis.
64.12	There is insufficient evidence of continued improvements in the wastewater quality discharged, especially at PW-02 and WW-02.	Current plant treatment infrastructure is not capable of meeting licence discharge limits. Significant additional works will be required to improve wastewater discharges.

Based on the assessment of compliance with relevant EPL230-01 conditions, the following key potential risks of environmental harm were identified:

- Potential risk to harm to marine environment associated with the presence of hydrocarbons in discharged produced formation water via PW-01.
- Potential risk of harm to beneficial use of groundwater associated with elevated concentrations of pathogens (E. coli), biological oxygen demand (BOD) and total suspended solids (TSS) (January 2021 only) associated with wastewater treatment plant discharges at WW-01.
- Potential risk of environmental harm associated with current and former usage of PFAS on-site.

5.3 Management Plans

Four management plans are listed on the NT EPA website associated with EPL230. Whilst these are not associated with a specific licence condition, with the exception of the Produced Formation Water Plan as required by Condition 44 of EPL230-01, they are considered relevant to guide specific measures to mitigate environmental impacts. These plans are as follows:

- Onshore Gas Plant Environmental Management Plan (EMP)
- Produced Formation Water Plan
- Flaring Management Plan
- Emergency Response Plan

The following key comments / observations are made in relation to these plans:

- Onshore Gas Plant Environmental Management Plan: there are a number of monitoring requirements which are not currently being complied with, particularly in relation to groundwater management. This plan is now more than 12 years old; it is recommended that the plan be reviewed and updated to reflect the current requirements for environmental management in line with relevant guidelines and regulations. The EMP should also incorporate an SAQP intended to meet the requirements of the EPL. This should outline data quality objectives (DQOs), data quality indicators (DQIs), sampling methods, laboratories to be used etc..
- Produced Formation Water Plan: Senversa has not reviewed the dilution modelling in this plan. However, the discussion on dilution of PFW hydrocarbons in the ocean is considered to have limited value. Hydrocarbons in PFW exceed the licenced discharge concentrations at the compliance point (PW-02) and hence ANZG aquatic protection criteria in close proximity to the Walpinhti Reef Exclusion Zone. In the Senversa's experience oceanic dilution is not used as a regulatory tool for licencing. It can be used to understand the extent of harm/significance of risk but not as a basis for arguing that non-compliance at PW-02 is compliant. It is understood that Eni is proposing to update the Produced Formation Water Plan and this should be undertaken. The intent of licence condition 65 should be discussed with NT EPA to better understand the balance between PFW discharge, the assessment of the impact of this (condition 65) and the monitoring of its impacts (condition 44). If condition 28 is being met then conditions 44 and 65 should not be required.
- Flaring Management Plan: not reviewed as part of this environmental audit.
- Emergency Response Plan: this plan identifies that an "*oil/condensate release of 200 litres at the YGP … to the environment is reportable to the authorities*". Eni should confirm that this aligns with the expectations of NT EPA.

5.4 Sampling Program

The Notice requires consideration of environmental harm and during the site inspection and audit multiple potential sources of groundwater contamination were identified. A number of beneficial uses of groundwater both on and off-site were also identified. However, groundwater conditions, such as flow direction, hydraulic gradient etc., are not known and there is limited information on the wells constructed on site.

Given the potential harm, the relative paucity of physical data and the EPA's requirement to close out these potential issues, site investigation is warranted to assess the full extent of groundwater impacts and potential risk of environmental harm.

The existing groundwater monitoring network comprises two licensed sampling locations (BH-5 and BH-7), located to the west of the main plant area. Groundwater well installation logs provided by Eni as part of the site audit indicated the following installations:

- BH-5: Drilled to 16 m bgl, screened 9.6 m bgl to 15.6 m bgl.
- BH-7: Drilled to 16 m bgl, screened 6.48 m bgl to 15.5 m bgl.

During the site inspection and audit a potential additional groundwater monitoring well was identified along the eastern boundary of the site, immediately south of the main entry gate (BH-1). Groundwater well installation logs indicated that this well was drilled to 56 m bgl, with various screened intervals (10 m bgl to 22 m bgl, 38 m bgl to 42 m bgl, 43 m bgl to 48 m bgl and 49 m bgl to 50 m bgl) with 100 mm casing. The condition of this well and suitability for inclusion in a monitoring program is currently unknown as it was not accessible for gauging at the time of the site inspection. Any data from this well would be opportunistic and the investigation program has been designed with this in mind.

It is considered that the existing well network, on its own, is not sufficient to establish an assessment of potential risk to groundwater from the sources that have been identified at the site. It is therefore recommended that installation and sampling of additional groundwater monitoring wells occurs. It is recommended that the works be completed by a suitably qualified and trained environmental consulting company, with groundwater samples analysed by an independent laboratory so that the validity of the groundwater sampling works to date can be verified. This will assist in determining the future sampling regime, so that any changes to EPL230-01 can be discussed with NT EPA.

The proposed sampling locations and rationale are presented in **Table 5.3**. Proposed groundwater sampling locations are presented on **Figure 1**.

Table 5.3: Proposed Groundwater Sampling Locations

Well ID	Type / Location	Rationale
BH-5 and BH-7	Existing groundwater monitoring wells located to the west of the main plant area.	Verify concentrations as reported in licence monitoring.
BH-1	Existing groundwater monitoring well located in the eastern portion of the site.	Opportunistic samples to assess the viability of this well as part of ongoing monitoring.
BH-A, B, C and D	Proposed groundwater monitoring wells situated to the north, east, west and south and north of the wastewater treatment plant irrigation field.	Assess potential groundwater impacts associated with wastewater discharges.
BH-E	Proposed groundwater monitoring well located adjacent to SW-03.	Assess potential impacts on groundwater quality from surface water discharge and flow direction.
BH-F, G and H	Proposed groundwater monitoring wells located on the western side of the plant generally.	Assess potential impacts to drinking water production bores and flow direction generally.
BH-I, J and K	Proposed groundwater monitoring wells located in the southern portion of the site.	Assess potential groundwater impacts potentially migrating beyond the boundaries of the site and flow direction.
BH-K, L and M	Proposed groundwater monitoring wells located on the pipeline alignment.	Assess groundwater quality in the area of the underground pipeline.

The proposed methodology is presented in **Table 5.4**. An indicative schedule has also been included so that works can be completed within the required timeframes of the NT EPA Notice.

Table 5.4: Groundwater Investigation Methodology

Task	Description	Schedule[1]
Bore Permit	A bore work permit issued under Section 57 of the Water Act 1992 will be required for each proposed location prior to drilling and construction of any groundwater monitoring well locations.	Submitted by 26 June 2023
Service Location	Proposed monitoring well locations will be cleared of underground and overhead services via the following methodology: • Review of available services plans comprising Before You Dig Australia searches. • Inspection of the site and immediate off-site areas for surface evidence or signage indicating utility locations. Tracing known and redundant (where possible) underground utilities using a ground penetrating radar.	26 July to 28 July 2023
Groundwater Well Installation	Groundwater monitoring wells will be advanced using direct push drilling methods to a depth of 2 m below the groundwater table (anticipated depth of 10 m bgl). Geological and environmental conditions encountered at each location will be logged based on the Unified Soil Classification System. This is of particular importance to assess potential preferential flow paths. Groundwater monitoring wells will be constructed using 50 mm machine slotted uPVC casing, washed filter sand (to 0.5 m above the top of the screened interval) and a 1.0 m bentonite clay seal. The screened intervals will be 3.0 m in length (2 m below and 1 m above the water table). Wells will be backfilled above the bentonite clay seal using drill cuttings. Wells will be finished with a lockable riser. After installation, each groundwater monitoring well will be developed until multiple lines of evidence indicate that appropriate well development has been achieved (i.e. for at least 15 minutes at each well or until water appears to be visually free from sediment). Wells will be developed using a high flow pump. Groundwater wells will be left to stabilise after development before sampling.	28 July to 2 August 2023
Groundwater Well Surveying	Newly installed and existing groundwater monitoring well locations and levels will be surveyed by a licensed surveyor to achieve ±0.1 m accuracy for lateral coordinates and ±0.01 m accuracy for vertical level so that the groundwater flow direction can be assessed.	9 August to 11 August 2023
Groundwater Monitoring Event	Groundwater sampling will be undertaken at the existing and newly installed groundwater monitoring wells in accordance with the following methodology: • Prior to sampling, all groundwater wells will be gauged for total depth, depth to water and depth to non-aqueous phase liquid (as applicable) using an oil/water interface probe from the top of the well casing. Gauging will be performed as a snap gauging effect to minimise potential influences on groundwater contours. • Groundwater gauging and sampling will be undertaken using low flow sampling methods. Drawdown will be monitored during purging to ensure that the water level does not fall more than 10 cm. Purging of groundwater will be undertaken until field indicator parameter measurements stabilise across three consecutive readings (pH (+/- 0.05), electrical conductivity (EC) (+/- 3%), temperature (+/-10%), dissolved oxygen (DO) (+/- 10%) and redox potential (+/- 10mV)). • Samples will be placed into laboratory prepared containers, preserved (where appropriate) for the relevant analyses. Samples for dissolved analysis will be field filtered using a 0.45 micron disposable filter. • Samples will be chilled during transport to the laboratories.	11 August to 16 August 2023

Task	Description	Schedule[1]
Groundwater Laboratory Analysis	Samples will be submitted to NATA accredited laboratories for the following analysis: • Environmental parameters (pH, EC, DO and BOD). • Nutrients (total and filtered total phosphorus and total nitrogen and filtered oxidised nitrogen, ammonia, nitrate and nitrite). • Escherichia coli and Enterococci • Total petroleum hydrocarbons (TPH) • Benzene, toluene, ethylbenzene, xylenes and naphthalene (BTEXN) • Oil and grease • PFAS (30 compounds).	16 August to 30 August 2023
Quality Assurance / Quality Control	Quality assurance and quality control (QA/QC) procedures will include the collection of: • One replicate sample pair (one duplicate and one triplicate sample) per 10 samples submitted. • One rinsate blank per non-dedicated sampling equipment per day. • One groundwater field blank per day. • One transport (trip) blank per matrix type, for each laboratory consignment.	Throughout
Reporting	Results from the investigation will be documented within the Final Environmental Audit Report. The report will include an assessment of results, quality assurance / quality control evaluation and relevant supporting documentation including tabulated results, field forms and laboratory certificates of analysis:	Draft to Eni: 2 October 2023 Final to NT EPA: **16 October 2023**

[1] The proposed schedule considers scheduled charter flights to enable efficient delivery of samples to laboratories.

6.0 Conclusions and Recommendations

An environmental audit was undertaken at the site in response to a “Notice to Carry Out Environmental Audit Program”. The environmental audit included:

- An assessment of actual environmental harm and the potential risk of environmental harm from contaminants and wastes present in the environment at and discharged from the premises;
- An assessment of current management systems and the suitability of the management systems to mitigate environmental impacts;
- Assess the actual and potential risk of environmental harm from activities conducted at the premises, as determined by:
    - A. review of systems, plans, procedures, monitoring programs, data, records, reports or information that is relevant to the scope of the audit as the auditor sees fit;
    - B. review of activities, processes, plant and equipment at the premises that is relevant to the scope of the audit as the auditor sees fit.

The Notice also required “*collection and/or modelling of data that is that relevant to the scope of the audit as the auditor sees fit*”, however this will be completed as part of a separate event, in line with the scope of work detailed in **Section 5.4**, as discussed further below.

As part of the environmental audit, a site inspection and audit were completed on 22 to 25 February 2023 to understand site operations and infrastructure, review management systems and supporting documentation and interview relevant personnel.

A number of instances of non-compliance with the licence conditions and opportunities for operational improvements were identified during the audit. The key findings were as follows:

- Over half the licence compliance requirements were either Non-Compliant or only Partially Compliant **Appendix B**.
- The current wastewater treatment infrastructure is not capable of meeting licence requirements in a number of instances. Significant upgrades are required in order to treat wastewaters to the required standard. These are specifically associated with hydrocarbons and heavy metals in PFW and bacteriological components of wastewater effluent. Both discharges may be posing a risk of harm to the environment at the discharge locations.
- Sampling plans / procedures should be updated and training provided to ensure that appropriate systems are in place to enable compliance with relevant monitoring conditions. Fundamentally, the EMP needs to be reconsidered and to incorporate an SAQP that responds to licence conditions.
- The Annual Monitoring Report provides limited data interpretation. The structure of this report should be updated to align with current industry best practice, including provision of supporting documentation. Data that feeds into the report should be provided in ESDAT format (or similar) to aid reporting and compliance assessment.
- Proposed amendments to EPL230-01 are recommended to reflect the actual risks and site conditions that have been identified as part of the environmental audit, for example amendment to sampling location SW-01 and changes to analytical suites. Senversa recommends discussion with NT EPA in that regard.
- Management plans relevant to the site are dated and do not reflect current site operational conditions. It is recommended that the EMP and Produced Formation Water Plan be updated to reflect the current situation and relevant guidelines and regulations.
- A groundwater investigation program is recommended to assess the potential risk of environmental harm to groundwater, as documented in **Section 5.4**. This should be undertaken and reported as part of the Final Environmental Audit Report.

The specific timeframe for implementation of recommendations should be discussed with Eni and NT EPA, however priority should be given to the recommended intrusive investigation works and investigating the appropriate treatment of PFW as these represent the greatest current potential for risk of harm to the environment.

These must be documented in the Final Environmental Audit Report provided to NT EPA no later than **16 October 2023**.

7.0 Principals and Limitations

This independent environmental audit report was prepared for Eni Australia Pty Ltd (Eni) in response to a “Notice to Carry Out Environmental Audit Program” issued by the Northern Territory Environment Protection Authority (NT EPA) on 14 October 2022.

The scope of work performed as part of the audit process may not be appropriate to satisfy the needs of any other person. Any other person’s use of, or reliance on, the audit document and report, or the findings, conclusions, recommendations or any other material presented to them, is at that person’s sole risk.

The audit is based on a review of the condition of the site at the time of assessment and as described in the supporting documentation viewed as part of the audit and site inspection conducted by the audit team.

The audit and this report are limited by and rely upon the review’s scope and the information provided to the audit team through the documents listed herein. The auditor’s conclusions presented in this report are therefore based on the information made available and on observations made during the audit. The auditor used reasonable care to avoid reliance upon data and information that may be inaccurate.

Figures

senversa

Legend

- Site Boundary
- Existing Groundwater Monitoring Well
- Proposed Groundwater Monitoring Well

Aerial Imagery © Esri

Created:	SK	Date:	13/03/2023
Reviewed:	AB	Revision:	0
Approved:		Scale:	1:5,000 (A3)
File:	D20289_002_F001		

0 25 50 100 150 200 250 Metres

Coordinate System: GDA2020 MGA Zone 52

Figure No: 1

Title: Proposed Sample Plan

Project: Environmental Audit

Location: Yelcherr Gas Plant, Lot No p.1637 WADEYE, Thamarrurr NT 0822

Client: ENI

Path: S:\01_Jobs\8.NT_Jobs\D20289_ENI_YELCHERR_GAS_PLANT_AUDIT\APRX\D20289_002.aprx

Appendix A: Jason Clay Curriculum Vitae

Jason Clay

Senior Principal Contaminated Site Auditor

Qualifications

BSc(Hons): Environmental Science, 1991
MSc: Water Environment, 1994

Career Profile

Jason Clay is a Senior Principal of Senversa. He has been an environmental consultant for approaching 30 years and specialises in risk-based assessment and remediation of soil and groundwater contamination and site auditing.

Jason is a state accredited Contaminated Site Auditor in WA and NSW and is a Certified Environmental Practitioner and Specialist in Contamination (CEnvP SC). Jason's career began investigating and remediating gas works and landfills in the UK. He has since gained significant experience in hydrocarbons, chlorinated solvents and PFAS on sites in Australia, New Zealand, Europe, Asia and South America.

Jason is a registered Principal Environmental Compliance Auditor (EARA) and undertakes compliance and vendor/acquisition due diligence on a regular basis.

Jason is providing advice to Ayers Rock Airport in regard to an NT EPA *Notice to Carry Out Environmental Audit Program* as relates to PFAS contamination of the airport.

Jason is the site auditor for the Varanus Island gas plant on behalf of Santos and regularly audits the sites produced formation water discharge data and considers the operations impacts on the environment. This work was conducted under full Class A asbestos conditions and was audited by a NSW EPA site auditor. Jason is a Competent Person as defined by the NSW Work Health and Safety Regulation and various associated asbestos codes of practice.

Jason is the biennial compliance auditor for Heron Resources Woodlawn copper and zinc and Aurelia Metals goldmine at Majors Creek. This involves seeking approval from the regulator to undertake the audit preparing the audit protocol, conducting a two day audit of the mine and reporting to the regulator at the end of the process.

Jason has recently assisted the NSW government on a series of infrastructure related acquisitions including St Peters Landfill, Alexandria, Burrows Road industrial estate, Alexandria, Prince of Wales Hospital (compulsory acquisition of residential streets) and sections of the former James Hardie manufacturing site on the Camellia Peninsula in Sydney. Jason also acted as a successful expert witness on these acquisitions. Jason assisted the NSW Department of Planning, Industry and Environment (DPIE) and the Hunter and Central Coast Development Corporation on the compulsory acquisition of the former Pasminco Cockle Creek Smelter remediation site. Advice here largely revolved around the costs associated with long term management of the 2M m^3 of contained smelter waste and groundwater treatment system.

Jason has provided advice in the Northern Territory on behalf of the Northern Land Council assuming responsibility for some former Defence land at Cow's Peninsula.

Expertise

Risk based land and groundwater contamination assessment, management and remediation

Statutory contaminated site auditing

Environmental due diligence.

Employment History

Aug 2015 (current): Senversa Pty Ltd

Aug 2009 to Aug 2015: AECOM Australia Pty Ltd

Aug 2004 to Aug 2009: ERM Australia Pty Ltd

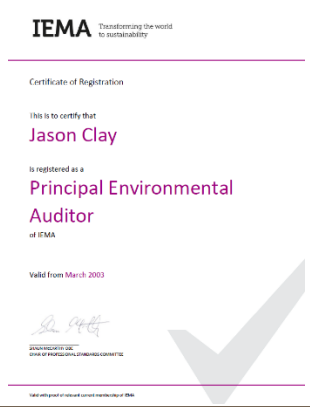
Dec 1997 to Aug 2004: Dames & Moore/URS

1993-1997 Parkman and Her Majesty's Inspectorate of Pollution (HMIP)

Memberships & Certifications

NSW EPA Accredited Site Auditor
WA DWER Accredited Contaminated Sites Auditor
Certified Environmental Practitioner Site Contamination Specialist (CEnvP SC)
Fellow of the Institute of Environmental Assessment and Management (FIEMA).
Fellow of the International Society of Risk Analysis
Fellow of the Chartered Institute of Water and Environmental Management (FCIWEM)
Chartered Scientist (CSci.)
Graduate of the Australian Institute of Company Directors (GAICD)
NSW Justice of the Peace

SafeWorkNSW Class B asbestos licenced.



Professional Training & Development

- Battelle International Conference on Remediation of Chlorinated and Recalcitrant Compounds 2016, 2014, 2012
- Clean-up 2019, 2017, 2015, 2013, 2011, 2009, 2007
- Eco-Forum 2018, 2014, 2012, 2010
- Todd Wiedemeier – Monitored Natural Attenuation two-day ACLCA course
- Steve Wilson – Landfill Gas two-day ACLCA course.
- 24 Hour Hazwoper, (27-29 Nov 2002) plus numerous 8-hour refreshers
- Baseline Security Clearance 31 October 2014 (652950)
- NSW Health and Safety Induction (White Card) (29 March 2004)
- Asbestos Awareness (17 April 2007)
- Remove non-friable asbestos CPCCDE3014A 11/7/2017
- Supervise asbestos removal CPCCBC4051A 14/77/2017
- Tropical Basic Offshore Safety Induction and Emergency Training (TBOSIET) 23-24 June 2014.

Project Experience

- **State Accredited Contaminated Site Auditing**. – Jason has successfully completed approaching 200 site audits and is currently involved in more than 20 on-going. Jason has successfully audited major infrastructure projects, power stations, leaking UST sites, landfills, industrial complexes, market gardens, major oil and gas infrastructure for contamination including asbestos.
- **Multiplex new Sydney Fish Markets** – Jason is the project director of the environmental aspects of the construction of the nSFM over the Sydney Harbour in Blackwattle Bay. This involves the replacement of a large volume of marine sediments and acid sulfate soils. Senversa has been intimately involved in the assessment and management of these sediments. .
- **AGL Macquarie** – Jason is the NSW EPA accredited site auditor working on the decommissioning of Liddell Power Station, Jason will work with the chosen consultant to select and approve an appropriate decommissioning plan that helps take Liddell into the next phase of its life.
- **Hunter & Central Coast Development Corporation (HCCDC)** – Jason worked with HCCDC on the compulsory acquisition of the former Pasminco Cockle Creek Smelter site. Jason provided evidence in Land and Environment Court on the contamination status of the residual site and the long term management costs of the containment cell constructed at the site.
- **City of Parramatta** – Senversa was engaged to undertake a contamination and land suitability assessment for McCoy Park, a former landfill now used as public open space and playing fields. After closure of the landfill in 1970 it was redeveloped to become McCoy Park with a minimum of remediation. The site was identified as a priority for investigation due to its heavy use by local residents and visitors and as it is located close to Toongabbie Creek. Council wanted to understand potential impacts to the environment and human health from the former landfill/public park. Jason directed the successful investigation of this issue.
- **Transport for NSW (TfNSW)** – Assisted TfNSW on the environmental liability questions related to asbestos contaminated waste/recycling materials aspects of the compulsory acquisition of St Peters Landfill from Dial a Dump Industries. Alexandria Landfill Pty Ltd v Roads and Maritime Services; acted as expert witness in Land and Environment Court.
- **Minister for Planning** – Expert witness in NSW LEC on behalf of the Minister for Planning (Dellara Pty Ltd v Minister for Planning and Penrith City Council [2012] NSWLEC 1186 https://www.caselaw.nsw.gov.au/decision/54a637b33004de94513d9c1b). The matter revolved around proposals to reuse land in Western Sydney where 5,000,000 m^3 of illegally dumped material contaminated with asbestos had been dumped. Jason assisted the Minister for Planning to ensure that the site followed the principles of SEPP55 and had the requirement for a section A site audit statement under the *Contaminated Land Management Act 1997* as a condition of consent.
- **Department of Defence** – Acted as Technical Advisor/Auditor (TA) for the RAAF Base Pearce PFAS investigation. He acted as Project Director for RAAF Base East Sale PFAS investigation during periods of leave.
- **Public Transport Authority-Perth Airport Link** - WA DWER contaminated site auditor for this major piece of rail tunnel infrastructure linking the CBD of Perth to the airport. The audit includes significant PFAS issues related to impacts at the airport.
- **Fire and Emergency Services Australia** – WA DWER contaminated site auditor for the demolition and redevelopment of a major fire station in Perth CBD contaminated with PFAS as a result of contamination with AFFF. Impacts have migrated off-site creating significant stakeholder consultation issues as part of this audit.
- **Lawrence Dry Cleaners**. Director of an Enhanced *In-situ* bioremediation (EISB) of PCE DNAPL in the Botany Sands aquifer in Sydney. This project is highly successful, is currently meeting the requirements of the Management Order and is one of the first schemes of its kind in Australia. Expert witness in NSW Land and Environment Court (LEC) for the first appeal of an EPA Management Order.

- **Reckitt Benckiser** - Director of the investigation, remediation and decommissioning of a former pesticide manufacturing facility in Sydney contaminated with chlorinated solvents and petroleum hydrocarbons.
- **TRW Automotive** – Adelaide. TCE DNAPL/plume remediation. Directed a project to assess and remediate a plume of chlorinated solvents in a South Australian sand aquifers using In-Situ Chemical Oxidation.
- **Ecolab** – Hale St, Botany. Directed the risk assessment of chlorinated solvent plume in the Botany Aquifer to derive remedial criteria for a steam injection system.
- **Dana** – Director of the $4M remediation of a manufacturing facility in western Sydney. Remediation involved removal of leaking hydrocarbons underground storage tanks (USTs) and excavation under a building to remove spilled oil and chlorinated compounds, gaining a Site Audit Statement at the end of the process.
- **Syngenta** – Pendle Hill, Sydney. A former chlorinated compound manufacturing facility in Sydney was remediated using a combination of techniques including thermal desorption and ex-situ bio-remediation. Risk-based screening levels were derived to allow remedial compliance to be tested for a number of pesticide derivatives in groundwater. Jason also assisted Syngenta with a number of issues on sites in India, Korea, Indonesia and China. Issued have included compliance auditing, soil and groundwater contamination and remedial engineering.
- **Boliden Mining - Los Frailes Environmental disaster, Seville, Spain**. Setting risk based remedial objectives and designing the sampling strategy to monitor subsequent remedial compliance over 800 hectares of land contaminated with mine tailings.

Publications

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- Clay, J., MacKay, S., Enright, J., Loose, H.; (2001). The Implications of the Current Contaminated Land Regime on the Water Industry. Report 01/WW/24/1. UKWIR, London.
- Clay, J. (2006). The Australian risk-based approach to assessing and remediating MGPs. Land Contamination & Remediation, Vol. 14 No. 2. EPP Publications.
- Clay, J., Harris, M.E. (2002) Risk Based Corrective Action of Hydrocarbon Contamination at a former Major Urban Petroleum Storage Site in the U.K. Soil and Sediment Contamination, 11(5):701-718. AEHS
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- Clay, J and Thompson B.A.W. (2007). Issues in Contaminated Land Management Risk Assessment Toxicology. *Journal of Toxicology and Environmental Health. Part A, 70: 1635-1637.*
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- Thompson, B.A.W & Clay, J (2007) Human health risk assessment of mercury impacts at a former thermometer factory in India: a probabilistic approach. Proceedings Contamination CleanUp07, Hilton Hotel Adelaide, 24-28 June.
- Clay, J, Thompson, B.A.W & Chau A. (2007). Review and Promotion of Risk-Based Remediation Goals as Contaminated Land Standards for Hong Kong. Proceedings Contamination CleanUp07, Hilton Hotel Adelaide, 24-28 June.
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- Perrett K.; Illing, P. and Clay, J (2007). An unusual problem in a primary school: a case of idiopathic environmental illness? *Chemical Hazards and Poisons Report. Chemical Hazards and Poisons Division, May 2007, Issue 9.* HPA, London.
- Clay, J. (2008). Removing solvents in sand aquifers. Water Engineering Australia. Volume 2, Number 4, June 2008.

Appendix B: Audit Compliance Checklist

Licence Condition	Requirement	Evidence	Comments / Audit Findings / Recommendations	Compliance Status
EPL 230-01				
	Commencement Date: 10 February 2020 Expiry Date: 9 February 2025 Anniversary Date: 10 February			
DISCAHRGES AND EMISSIONS				
22	The licensee must ensure there is no migration or overflow of a contaminant or waste, which causes or may cause environmental harm, beyond the boundary of the land on which the premises are located. (For the avoidance of doubt, this condition is not intended to authorise the discharge of a contaminant or waste to any land or water to which discharge has not been specifically authorised by another condition of this licence.)			
23	The licensee must not allow a contaminant or waste, which causes or may cause environmental harm, to enter water.			
24	The licensee must ensure that stormwater does not come into contact with a contaminant or waste, which causes or may cause environmental harm.			
Discharges to land and water				
25	This licence authorises discharge of wastewater from the authorised discharge points as identified in Attachment 1.	Authorised discharge from PW-01, WW-01, SW-01 and SW-03 Firewater pump cooling wastewater discharge to land actually occurs at SW-02 not SW-01 due to system setups. Unauthorised discharges - 2m^3 of Produced Formation Water lost to ground in September 2021 (37.6 mg/L OIW). The hose on the skid unit was disconnected (CETCO filters). PFW loss reported in AEMR 2021. - 10 L condensate loss associated with hose issues (circa November 2022). Documented in hazard report cards. - Approximately 6 L mist of PFW associated with a broken pipe during cleaning of PFW tank (February 2023). Documented in hazard report cards. Any unauthorised discharges are reported via an incident reporting system (Indico).	Indico incident reporting system - not working at the time of the audit. Incidents were reviewed via hard copy records. Unauthorised discharges have been relatively minor and are well documented, including remedial efforts. No environmental harm considered likely as a result.	**Partially Compliant**
26	The licensee must ensure that all discharges consist only of wastewater from the source as specified for each authorised discharge point in Attachment 1.	PW-01: Produced Formation Water discharged via diffuser to ocean WW-01: Treated wastewater effluent to irrigation field SW-01: Firewater pump cooling wastewater discharge to land. Discharge actually occurs at SW-02 due to system setups. SW-03: Stormwater overflow from process skids into open drains sump to land	Licence amendment may be required associated with discharge at SW-02.	**Partially Compliant**
27	The licensee must, for each authorised discharge point, install, operate and maintain a device to measure and record, for each discharge event: 27.1 the time the discharge commenced and the duration of the discharge; 27.2 the discharge rate of flow; and 27.3 the discharge volume.	PW-01: Duration of discharge not recorded, however typically discharged for 4-5 hours daily. WW-01: Time, duration and rate of flow of discharge not recorded. Daily discharge volumes recorded. SW-01 (SW-02): Time, duration, rate of flow and volume of discharge not recorded (estimated to be 448 m3 per month, however this had a degree of uncertainty). SW-03: Time, duration, rate of flow and volume of discharge not recorded.		**Partially Compliant**
28	The licensee must ensure that wastewater discharged from the authorised discharge points does not exceed the limits specified in Attachment 2.	AEMR 2021 indicates the following: - PW-02: A number of parameters exceeded the Limits (including, but not limited to, BTEX, Mn, Zn). - WW-02: A number of parameters exceeded the Limits (including, but not limited to, pH, E.coli, BOD, TSS).	The OIW result for PW-02 as reported by the off-site laboratory is consistently higher than the reading recorded at the on-site laboratory (although still below Limits). It is recommended that further treatment of wastewater at these locations should occur prior to discharge to reduce potential risk of harm to receiving environments.	**Non-Compliant**
29	The licensee must ensure that the discharge from all discharge events at each authorised discharge point does not: 29.1 contain any floating debris, oil, grease, petroleum hydrocarbon sheen, scum, litter or other objectionable matter; 29.2 cause or generate odours which would adversely affect the use of surrounding waters; 29.3 cause algal blooms in the receiving water; 29.4 cause visible change in the behaviour of fish or other aquatic organisms in the receiving water; 29.5 cause mortality of fish or other aquatic organisms; or 29.6 cause adverse impacts on plants	PW-02 samples checked several times a day by operational staff, observations noted on field sheets (cloudiness etc.). No direct records of field observations kept for discharges from WW-01, SW-01 or SW-03. No reported environmental incidents. SW-03 was discharging at the time of the site audit and appeared free from any matter/		**Compliant**

Licence Condition	Requirement	Evidence	Comments / Audit Findings / Recommendations	Compliance Status
EPL 230-01				
Emissions to air				
30	This licence authorises emissions from the authorised emission points as identified in Attachment 3.	A01 - A09 No other air emissions observed.		**Compliant**
31	The licensee must ensure that air emissions do not exceed the limits specified in Attachment 4.	No exceedances of Limits reported.	There is a Limit for VOCs at A01 and A02, however monitoring at these locations is not required as part of EPL230-01. VOCs could potentially be removed from the licence - these have not been detected to date.	**Compliant**
32	The licensee must at each authorised emission point to air, operate a device to measure the rate of flow of emissions.	Observed flow rate recordings in operations room. FIT.002 (low pressure flare meter) broken. Replacement en-route from Singapore.		**Partially Compliant**
33	The licensee must record the time, date and duration of emissions.	Emissions recorded in daily production records. Observed in operations room.		**Compliant**
34	The licensee must accurately calculate the mass of emissions.	Mass of emissions reported in AEMR 2021, emissions calculated as part of NGER reporting.		**Compliant**
35	The licensee must ensure that all instruments, equipment and measuring devices used for measuring or monitoring in accordance with any condition of this licence must be calibrated, appropriately operated and maintained.	Instrumentation records maintained as part of the "SAP Documentation Program" (internal Eni system). Air monitoring reports do not provide calibration information.		**Non-Compliant**
36	The licensee must ensure that the activity does not cause or release, beyond the boundary of the premises: 36.1 visible steam; 36.2 smoke; 36.3 offensive odour; 36.4 dust or particulates; or 36.5 noise which unreasonably interferes with or is likely to unreasonably interfere with the enjoyment of the area by persons who occupy a place within the area or are otherwise lawfully in the area.	No observations of visible impacts beyond the boundary of the site at the time of the site audit. Eni were not aware of any complaints recorded. Completed spot check of incident database and hazard card process and did not identify any incidents related to air emissions.		**Compliant**
MONITORING				
41	The licensee must conduct wastewater discharge monitoring in accordance with Attachment 2.	AEMR 2021 indicates the following: - SW-01: No annual monitoring results presented for this location (or the replacement location SW-02). - PW-02: No annual monitoring for radium isotopes, missing some monthly result for Mn, missing some quarterly results for MBA and nutrients, speciated chromium. The Eni response to the Show Clause Notice item 3a states that for monitoring site SW-01, "*This sampling regime has since been returned to activity within our SAP System*". This response requires revision as no sampling is undertaken at SW-01 due to the limited water flow at this location. Sampling is instead completed at SW-02.	Additional data have been identified by Eni and provided in an additional 'Environmental Data' spreadsheet, however this did not include all required wastewater discharge monitoring as per the licence. Commercial detection limits for CrVI and the value of this analysis should be discussed with NT EPA. A number of the required analytes do not have Trigger Values or Limits and therefore the value of this analysis should be discussed with NT EPA. Further discussion with NT EPA around requirement for total and filtered metals analysis should also be considered. PFAS has not been included in the analytical suite but may be a potential contaminant of concern associated with firewater system.	**Non-Compliant**
42	The licensee must conduct air emission monitoring in accordance with Attachment 4.	AEMR 2021 indicates the following: - A03 to A08: No biannual results presented for CO, NOx, VOC (only annual results). No CO_2 and CH_4 results presented. Eni advised that this was due to access restrictions associated with border closures associated with COVID-19. Biannual monitoring completed by Ektimo (Victoria based technical services supplier). Very limited reporting - no QA/QC discussion, no discussion of calibration, methodology, etc. .	Consider inline monitors to provide ongoing air emissions data rather than biannual monitoring.	**Non-Compliant**
43	The licensee must conduct groundwater monitoring in accordance with Attachment 5.	AEMR 2021 indicates the following: - No TPH results provided (OIW only). - It is unclear if the results for total nitrogen and phosphorus are total or dissolved.	Additional data have been identified by Eni and provided in an additional 'Environmental Data' spreadsheet. One data point (September 2021) still missing. TPH groundwater analysis has now been commenced (using method USEPA 1664), however does not appear to be NATA accredited. An additional groundwater monitoring well location (BH-1) was identified during a site walkover, located in the north-eastern portion of the site, to the south of the main access gate. PFAS has not been included in the analytical suite but may be a potential contaminant of concern. Whilst not a licence requirement, potable water is tested daily from various water outlets (pH and chlorine) sampled monthly for laboratory analysis (chlorine, TDS, total coliforms, *E. coli* , and HPC).	**Non-Compliant**

Licence Condition	Requirement	Evidence	Comments / Audit Findings / Recommendations	Compliance Status
EPL 230-01				
44	The licensee must ensure that annual marine sediment and biota monitoring is conducted by a suitably qualified professional, in accordance with the latest version of the Produced Formation Water Plan and The Australian Government National Assessment Guidelines for Dredging 2009, to determine the long term impact of discharge of wastewater to the marine ecosystem including the Walpinhthi Reef Exclusion Zone.	AEMR 2021 indicates that sampling was undertaken in May 2021. Monitoring has been completed by Eni Environmental Advisor and Thamarrurr Rangers (sediment and mollusc collection at coastal locations), three sites (one control and two headlands). Analysis completed by Intertek (metals, BTEX, TRH and PAH). Hydrocarbons below detection. Metals concentrations consistent with background. Intertek is not NATA accredited for this method.	Risk to Walpinhthi Reef Exclusion Zone hasn't been appropriately assessed based on sampling. PW-01 is located approximately 500 m from reef. The current monitoring regime is not consdiered to be effective in assessing the risk to marine ecosystems. Produced Formation Water Plan should be updated with a revised monitoring strategy which should include some monitoring at discharge location (PW-01) and nearby sensitive environment (Walpinhthi Reef). Or the PFW discharge should be cleaned up and Eni requests that this element of work be dropped from the licence.	**Non-Compliant**
45	The licensee must measure and record fuel/gas flow from the flow meters listed in Attachment 4.	Recorded in process data recording system. Observed flow rate recordings in operations room.		**Compliant**
46	The licensee must ensure that all samples and field environmental data are representative of the conditions at the time of sampling.	Groundwater sampling is undertaken using a bailer, re-used, not decontaminated. No groundwater purging completed prior to sampling. All other samples collected directly into sample containers from outlets. Some analysis completed at the on-site laboratory (e.g. field parameters such as pH, temperature and OIW analysis). OIW analysis completed using Horiba Oil Content Analyser. The Oil Extraction Solvent used is reclaimed and has a reported OIW of 2.6 mg/L.	The Eni sampling plan needs updating in accordance with current industry standards. This should include appropriate training of samplers to ensure representative samples are being collected in accordance with NT EPA requirements.	**Non-Compliant**
47	The licensee must ensure that all samples and field environmental data are collected in accordance with recognised Australian Standards and guidelines (such as AS/NZS 5667, ANZECC/ARMCANZ).	Samples collected into bottles provided by the laboratory. Samples stored and transported in eskies. No field quality control samples collected.	The Eni sampling plan needs updating in accordance with current industry standards. This should include appropriate training of samplers to ensure representative samples are being collected.	**Non-Compliant**
48	The licensee must ensure that all monitoring samples are analysed at a laboratory with current NATA accreditation or equivalent, for the parameters to be measured. Except as otherwise authorised by the Administering Agency.	Laboratory analysis completed by Intertek, NT (subcontracted out to various laboratories. Senversa was provided with an example laboratory report from PW-02 sampling on 17/12/2022 (Report No. AU115-0005141) which included TRH, BTEX and PAH analysis. This indicates analysis was subcontracted to EnviroLab (Report No. 313943). The laboratory report for EnviroLab was not available. Senversa was provided with an example laboratory report for five samples described as potable, produced and waste water analysis (sample identifications do not directly correspond with sampling points) from sampling on 17&21/12/2022 (Report No. NT55029) which included nutrients, metals and other parameters (BOD, etc.). Holding time analysis breach for some parameters. There was no supporting quality control data. Some of the analysis being completed is not NATA accredited (for example TPH analysis in groundwater).	Insufficient data presented in the Intertek lab report. The quality of the laboratory reports does not provide sufficient data to verify the results. OIW is not a NATA accredited test and cannot be NATA accredited. Eni should consider alternative NATA accredited environmental laboratories for analysis.	**Non-Compliant**
49	The licensee must for all land based monitoring points: 49.1 install and maintain appropriate identification signage so that they are reasonably identifiable at all times; and 49.2 maintain safe access and egress, as is reasonably practicable.	Access and signage for sampling points appropriate.		**Compliant**
50	The licensee must ensure any samples collected in accordance with Attachment 2, Attachment 4, or Attachment 5, or in connection with the activity or this licence, are obtained by, or under the supervision of a qualified sampler.	Sampling was previously completed by Intertek. Sampling is now completed by in-house operators who have not been trained in environmental sampling methods.	Samplers should be trained in the correct sampling methods to ensure that appropriately representative samples are collected.	**Non-Compliant**
51	For each sample required to be collected by this licence the following information must be recorded and retained: 51.1 the date on which the sample was collected; 51.2 the time at which the sample was collected; 51.3 the location at which the sample was collected; 51.4 the name of the person who collected the sample; 51.5 the chain of custody forms relating to the sample; 51.6 the field measurements (if any) and analytical results (if any) relating to the sample; and 51.7 laboratory quality assurance and quality control documentation.	Sampling information is recorded on COC, date and time sampled not being recorded. Field measurements recorded on field sheets stored in laboratory. Some issues with DO meter. Laboratory quality assurance / quality control documentation not provided by the laboratory.	Laboratory should be contacted regarding absence of quality assurance / quality control documentation.	**Partially Compliant**

Licence Condition	Requirement	Evidence	Comments / Audit Findings / Recommendations	Compliance Status
EPL 230-01				
RECORDING AND REPORTING				
52	All records required to be kept by this licence must be in a legible format.			Compliant
53	The licensee must maintain records of the nature, quantities and disposal method of all waste streams generated at the premises, including Listed Waste.	Waste Streams: - ToxFree: Oily water waste, oily sludge, cooking oil, scrap steel, waste batteries, fluro tubes, JetA1 (4 x 200 L drums replaced yearly), general waste. - Local Rangers: Containers for change . - Local Landfill (Daly River Shire, unconfirmed licencing): Food and organics waste (kitchen wastes). Transport records for wastes (via barge to ToxFree). Transport manifests (Excel spreadsheets, consignment notes are sent with wastes).		Compliant
54	The licensee must maintain records of the nature, quantities and source of waste generated at the premises in each successive 12 month period following the commencement date of this licence.	Records are maintained for the entire operation of the plant.		Compliant
55	The licensee must retain records relating to waste, including listed waste, as required by the conditions of this licence, for a period of 2 years after the end of the 12 month period to which the record relates.	Records are maintained for the entire operation of the plant.		Compliant
56	The licensee must keep records of all non-compliances with this licence. These records must be adequate to enable the licensee to comply with the non-compliance notification conditions of this licence.	AEMR 2021 includes a list of non-compliances with EPL 230-01 (Table 9.1).		Compliant
57	The licensee must notify the NT EPA of any non-compliance with this licence by emailing waste@nt.gov.au, as soon as practicable after (and in any case within 24 hours after) first becoming aware of the non-compliance.	Exceedances of Limits were generally reported to NT EPA Jan to Sep 2021. Not reported from Oct 2021 onwards due to staff resourcing issues. There is a delay of almost 4 weeks in receipt of laboratory data. AEMR 2021 has reported SOx values where as the licence requires SO2.	Data management, including provision of laboratory data, doesn't appear to be streamlined which has resulted in some significant delays in reporting.	Non-Compliant
58	The licensee must include in the notification of non-compliance the following information: 58.1 when the non-compliance was detected and by whom; 58.2 the date and time of the non-compliance; 58.3 the actual and potential causes and contributing factors to the non-compliance; 58.4 the risk of environmental harm arising from the non-compliance; 58.5 the action(s) that have or will be undertaken to mitigate any environmental harm arising from the non-compliance; 58.6 corrective actions that have or will be undertaken to ensure the non-compliance does not reoccur; 58.7 if no action was taken, why no action was taken; and 58.8 a date when an incident investigation report will be submitted to the NT EPA.	Reported in Table 9.2 of AEMR 2021.		Compliant
59	A non-compliance with this licence includes an exceedance of a limit as specified in Attachment 2 or Attachment 4.	See above (Condition 57).		
60	The licensee must keep records of all exceedances of trigger values specified in Attachment 2 and Attachment 4. These records must be in accordance with condition 61.	AEMR 2021 includes a list of trigger value exceedances including an assessment of cause and actions undertaken (Table 9.2).	Appropriate detail included as required by Condition 61 below.	Compliant
61	The licensee must ensure that the record of the trigger value exceedance includes the following information: 61.1 when the exceedance was detected and by whom; 61.2 the date and time of the exceedance; 61.3 the actual and potential causes and contributing factors to the exceedance; 61.4 the risk of environmental harm arising from the exceedance assessed in accordance with relevant standards; 61.5 the action(s) that have or will be undertaken to address the exceedance and/or environmental harm; and 61.6 if no action was taken, why no action was taken.	See above (Condition 60).		
62	The licensee must submit a completed Annual Return via NT EPA Online within 20 business days after each anniversary date of this licence, which report relates to the preceding 12 month period.	Annual Return for period 10 February 2021 - 9 February 2022 submitted on 9 March 2022 (due 10 March 2022). Annual Return for period 10 February 2022 - 9 February 2023 due 10 March 2023.		Compliant
63	The licensee must complete and provide to the NT EPA a Monitoring Report, as prescribed by this licence, within 20 business days after each anniversary date of this licence.	Annual Environmental Monitoring Report for period 10 February 2021 - 9 February 2022 submitted on 10 March 2022 (due 10 March 2022). Annual Environmental Monitoring Report for period 10 February 2022 - 9 February 2023 due 10 March 2023.		Compliant

Licence Condition	Requirement	Evidence	Comments / Audit Findings / Recommendations	Compliance Status
EPL 230-01				
64	The licensee must ensure that each Annual Monitoring Report:			
	64.1 includes an updated description of gas plant infrastructure and processes;	Section 3 of the AEMR provides a summary of gas plant infrastructure and processes. The description of gas plant infrastructure and processes provided in the AEMR were consistent with those observed during the site audit.	Inclusion of a process diagram may provide further clarity around plant processes.	**Compliant**
	64.2 reports on total condensate produced and total gas processed by the gas plant;	Section 4 of the AEMR reports on the total condensate produced and total gas processed by the gas plant. Reported values are within licence limits.	The reporting period is a calendar year (1 January - 31 December), whereas the reporting period for the AEMR is 10 February - 9 February). This is not considered to be a significant issue.	**Compliant**
	64.3 reports on the quality of gas received by the plant;	Section 4.4 of the AEMR provides details of gas composition (Blacktip reservoir fluid properties and contaminants in Blacktip Gas).	The proportion of gas/condensate/PFW has changed over time, and this has resulted in increased volumes of PFW. It is understood that a new production well will be commissioned soon and this may alter the quality of gas received.	**Partially Compliant**
	64.4 includes a tabulation of all monitoring data required as a condition of this licence;	Appendices of the AEMR include tabulated data. There are a number of relatively minor errors in the tabulated data such as incorrect shading of exceedances, missing footnotes, etc.	A data management system such as ESdat would assist with this.	**Compliant**
	64.5 includes a trend analysis and interpretation of all monitoring data required as a condition of this licence;	No data interpretation included in the report.	The report structure should be updated to include data interpretation and trend analysis.	**Non-Compliant**
	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;	Appendices of the AEMR include trend graphs for waste water and groundwater for a three year period.	No trend graphs for stormwater, produced formation water or air emissions have been provided. No discussion of trend analysis presented in the report.	**Non-Compliant**
	64.7 reports the total annual emissions for each emission point, condensate tanks and fugitive emissions;	Appendix A of the AEMR includes annual pollutant mass inventories (in t) as sourced from NPI and 2021 NGER report.		**Compliant**
	64.8 reports the frequency and volume of wastewater discharges for the reporting period;	Section 6 of the AEMR reported on the frequency and volume of wastewater discharged.	The volume of stormwater from SW-03 was not reported. The volume and days of discharge for produced water (Table 6.1) were inconsistent with the date presented in Appendix B.	**Partially Compliant**
	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;	See above (Condition 60).		
	64.10 is prepared in accordance with the requirements of the NT EPA Guideline for Reporting on Environmental Monitoring; and	As noted for Condition 64.4, there are a number of relatively minor errors in the tabulated data such as incorrect shading of exceedances, missing footnotes, etc. Insufficient data is presented to evaluate quality assurance / quality control. Insufficient discussion and interpretation of results has been provided	Revisions to the format of the Annual Report should be made to achieve compliance with the guideline.	**Partially Compliant**
	64.11 demonstrates continuous improvement in air emissions from the authorised air emissions points identified in Attachment 4; and	A number of actions were identified in the AEMR 2021 with regards to improvement activities associated with air emissions.		**Compliant**
	64.12 demonstrates continuous improvement in wastewater quality from the authorised discharge points identified in Attachment 2.	This does not appear to be adequately addressed as part of AEMR 2021. Eni are currently undertaking investigation into quality of PFW, production chemist has attended site (recommended engaging technical specialist in oil in water removal). Feasibility study to address PFW issues.	Additional works are required to improve wastewater discharges.	**Non-Compliant**
PERFORMANCE IMPROVEMENT				
65	The licensee must provide a report by 30 October 2022, that validates the hydrodynamic model predictions used in the latest version of the Produced Formation Water Plan. The report must: 65.1 define the mixing zone in accordance with the NT EPA Guidelines on Mixing Zones; 65.2 determine appropriate monitoring points in the receiving environment to detect any environmental impact from the authorised discharge; and 65.3 determine appropriate trigger values and/or limits to be applied in the receiving environment or at the authorised discharge point.	Outfall Monitoring Report prepared by CDM Smith, dated 25 March 2021. The NT EPA reports that the model was not provided to them by the required time.	There was previously a proposal for amendment to this condition. Updates to Produced Formation Water proposed.	**Non-Compliant**
66	The licensee must, by 30 October for each year of this licence, provide an Annual Marine Survey Report in accordance with condition 44.	Sampling completed on 23 July 2022. Report submitted on 9 December 2022 in error.		**Partially Compliant**

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