BW Offshore Catcher (UK) Ltd, 2023 Environmental Statement

This document is part of BW Offshore's Management System, which holds the complete revision history and electronic versions of attachments.

Document Owner: HSE Manager	*Approval:* Asset Manager
	Verification: VP HSSEQ Fleet

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ABBREVIATIONS

BEIS	Department of Business, Energy & Industrial Strategy
Cefas	Centre for Environment, Fisheries and Aquaculture Science
CH_4	Methane
CHARM	Chemical Hazard and Risk Management
CNS	Central North Sea
CO	Carbon Monoxide
CO_2	Carbon Dioxide
CRA	Chemical Risk Assessment
DESNZ	Department for Energy Security and Net Zero (formerly BEIS)
ESD	Emergency Shut Down
ETS	Emissions Trading Scheme
FGL	Fulmar Gas Line
FPSO	Floating Production Storage and Offloading Vessel
FPV	Floating Production Vessel
HSE	Health, Safety and Environment
HP	High Pressure
ISO	International Standards Organisation
LAT	Lowest Astronomical Tide
LP	Low Pressure
NC	Non-Compliance
NO_x	Nitrous Oxides
OCNS	Offshore Chemical Notification Scheme
OCR	Offshore Chemicals Regulations
ODP	Oil Discharge Permit
OPEPs	Offshore Pollution Emergency Plans
OPRED	Offshore Petroleum Regulator for Environment & Decommissioning
OIW	Oil in Water
OSPAR	Oslo Paris Convention for the Protection of the Marine Environment of the North-East Atlantic
PDN	Permitted Discharge Notification
PLO	Poses Little or No Risk
PLONOR	Poses Little or No Risk
PON	Petroleum Operations Notice
PPC	Pollution, Prevention and Control
SEGAL	Shell Esso Gas and Associated Liquids
SEMS	Safety and Environmental Management System

SO_x	Sulphur Oxides
STP	Submerged Turret Production
SUB	Chemicals Rated for Substitution
UK	United Kingdom
UKCS	United Kingdom Continental Shelf
VOC	Volatile Organic Compound

1 Introduction

1.1 Purpose

BW Offshore has one legal entity currently operating in the United Kingdom Continental Shelf (UKCS), BW Offshore Catcher (UK) Ltd, hereafter referred to as BWOCUK. BWOCUK is the Duty Holder / Operator of the BW Catcher Floating, Production, Storage and Offloading (FPSO) facility which is currently producing from the Catcher Area Fields (Harbour Energy are the licence holder for the Catcher Field Area).

Under Recommendation 2003/5 of the Oslo Paris Convention for the Protection of the Marine Environment of the North-East Atlantic (OSPAR), the Offshore Petroleum Regulator for Environment and Decommissioning (OPRED) requires that all companies operating in the UKCS have systems and procedures in place to identify, monitor and control the environmental aspects associated with offshore activities.

BW Offshore's worldwide operations are certified to the international environmental management system standard, ISO 14001. Recertification of the BW Offshore ISO 14001 environmental management system was concluded in September 2020.

Surveillance visits by the BW Offshore verifier are undertaken annually throughout the fleet.

This report provides information on BWOCUK's offshore operations and the environmental performance of these operations. For the purpose of this report, this includes all production activities in the United Kingdom Continental Shelf (UKCS).

This report has been made available on the BW Offshore website.

2 Overview of Operations

The Catcher Area Development is located in Block 28/9 of the central North Sea (CNS) c. 170 km southeast of Aberdeen and c. 100 km from the UK/Norway median line in water depths of c. 85 m Lowest Astronomical Tide (LAT) (***Figure 2-1***).

The BW Catcher FPSO has been contracted by Harbour Energy to produce from three fields: Catcher, Varadero and Burgman. The three fields are tied back to the BW Catcher FPSO vessel located at c. 56°46'12.43" N and 00°42'46.93" E (WGS84) ***(Figure 2-2)***. The principal facilities include subsea facilities and a turret-moored and free weather-vaning FPSO.

The FPSO is capable of processing up to 66,000 bbls of oil per day and has a maximum cargo storage capacity of 650,000 bbls. Therefore, at maximum capacity the FPSO offloads the processed crude oil to a shuttle tanker approximately once every 8 days. When offloading cargo, tank blanketing will normally use low pressure (LP) fuel gas, with this gas being recovered via the flare gas recovery package during filling of the cargo tanks between offloads. Initially, produced gas will be used for power generation and gas lift, with excess being exported into the Shell Esso Gas and Associated Liquids (SEGAL) system (Fulmar Gas Line (FGL) to St Fergus gas pipeline).

In normal operations, BW Catcher flaring will be restricted to high pressure (HP) flare purge gas only. The LP flare system includes a Vapour Recovery Package to recover purges and vents sent to the LP flare system. The LP flare will be lit, as required, in process upset or ESD conditions only. Produced water will be treated and then either re-injected or discharged under an Oil Discharge Permit (ODP) issued by DESNZ.

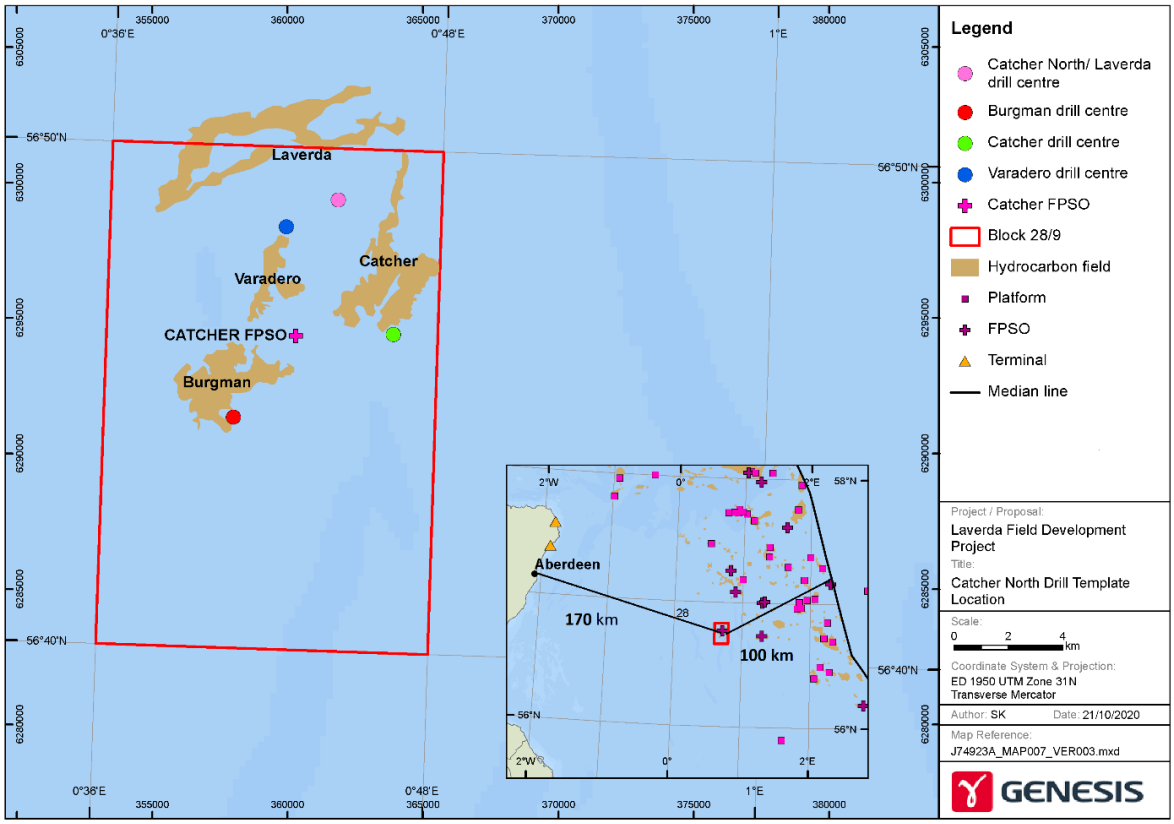

***Figure 2-1*: BW Catcher General Location Map**

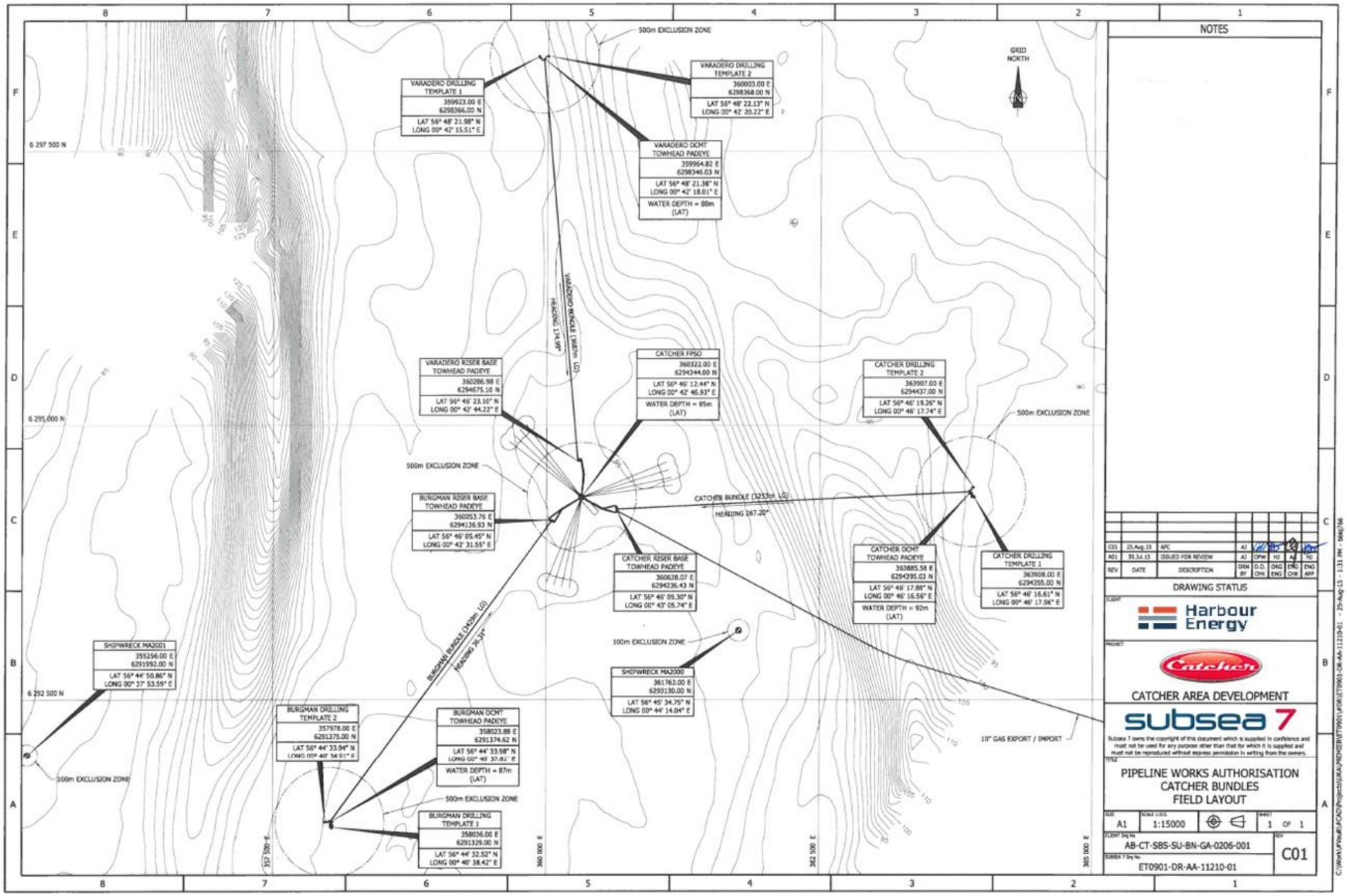

Figure 2-2: **Catcher Area Development**

The BW Catcher FPSO in field commissioning activities commenced following hook up in October 2017. The FPSO achieved First Oil on the 23rd December 2017. An interim performance test was successfully completed on the 6th January 2018. Client final acceptance performance test following commissioning was achieved in July 2018 with final acceptance certificate being issued in November 2018.

Gas lift has been commissioned on the Catcher, Burgman and Varadero production wells, including the wells of Varadero Template 2 which were drilled during 2020. Subsea tie-in of Varadero Template 2 was completed and commissioned in September 2020.

An additional drill centre, Catcher North/ Laverda (CN/L), was installed during the same subsea campaign and has pipeline tiebacks to the Varadero Bundle. The Laverda production well was not deemed a commercial success and therefore was not commissioned. Catcher North and Burgman production wells were completed and commissioned in Q4 2022.

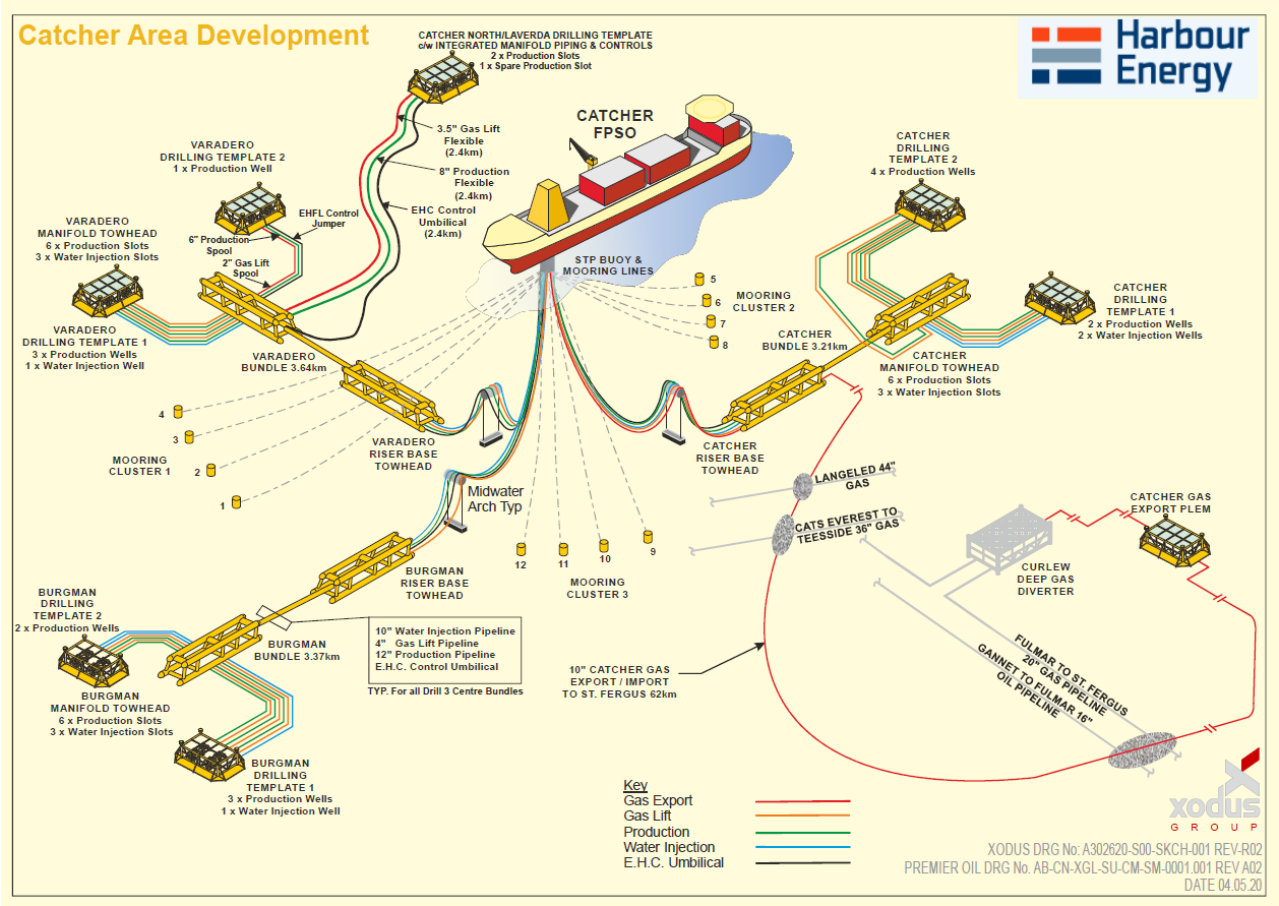

Figure 2-3 provides field layout drawing of the Catcher Field Area with the CN/L facilities.

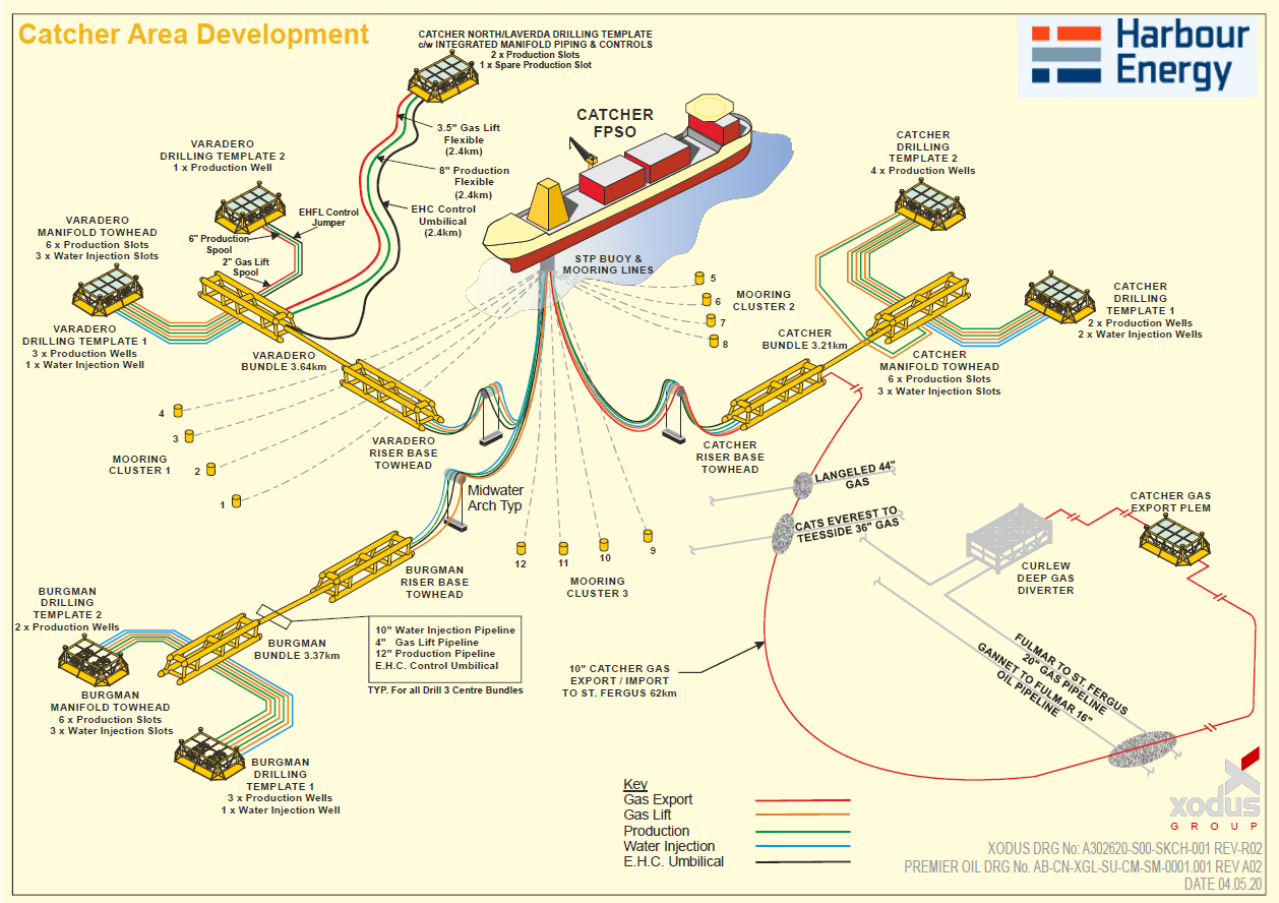

Figure 2-3: **Catcher Area Development.**

3 BW HSE Policy UK

BW Offshore is focused on protecting the environment in line with our stated commitment to reduce our impact to a level that is as low as reasonably practicable. This involves ongoing assessment, monitoring and reporting on environmental impacts.

The BW Offshore Management System (MS) exists to provide a systematic approach to the management of Health, Safety and Environment (HSE) issues in order to protect people and the environment and comply with UK legislation. The BW Offshore MS takes on the same purpose as a Safety and Environmental Management System (SEMS) as described within Safety Case Regulations.

BW Offshore considers that HSE have equal status with other primary business objectives and are of strategic importance. Safe working practices and due consideration of environmental impact are vital to the overall efficiency and continued success of the business. The HSE policy forms the basis for the MS and is presented below.

POLICY STATEMENT

BW Offshore is committed to prioritizing Health, Safety and Environment (HSE) matters in all its operations. We shall continually improve our HSE performance and strive to prevent harm to People, the Environment and Property as we firmly believe that all incidents can be prevented

In order to achieve our commitment, BW Offshore shall:

- Ensure Major Accident Hazards are effectively managed throughout the lifecycle of our assets
- Ensure a robust risk management process is in place to identify and mitigate all operational risks
- Plan our operations in a way that minimize environmental impact and prevents pollution
- Fulfil all compliance obligations
- Register faithfully and analyze all incidents and near misses
- Encourage proactive participation from all personnel on HSE matters to identify needs for training and development
- Set objectives and targets for HSE performance, monitor and communicate the performance to all personnel and stakeholder
- Enhance HSE performance through continual improvement initiatives
- Promote stop and ask without consequences
- Fulfil its duty of care towards anyone associated with BW Offshore name
- Ensure all our people, and our contractors have the competencies required to safely undertake their role and responsibilities
- Communicate internally and externally with the workforce, relevant stakeholders and interested parties on all aspects of HSE Policy

The MS meets the requirements of The Offshore Installations (Offshore Safety Directive) (Safety Case) Regulations 2015 and Offshore Installations (Safety Case) Regulations 2005, in particular the contents of Schedules 2 and 3.

The SEMS requirements are met by using the existing processes and procedures contained within the BW Offshore Integrated Management System and supplementing with processes and procedures specific to the operations of BWOCUK in the UKCS (***Figure 3-1***).

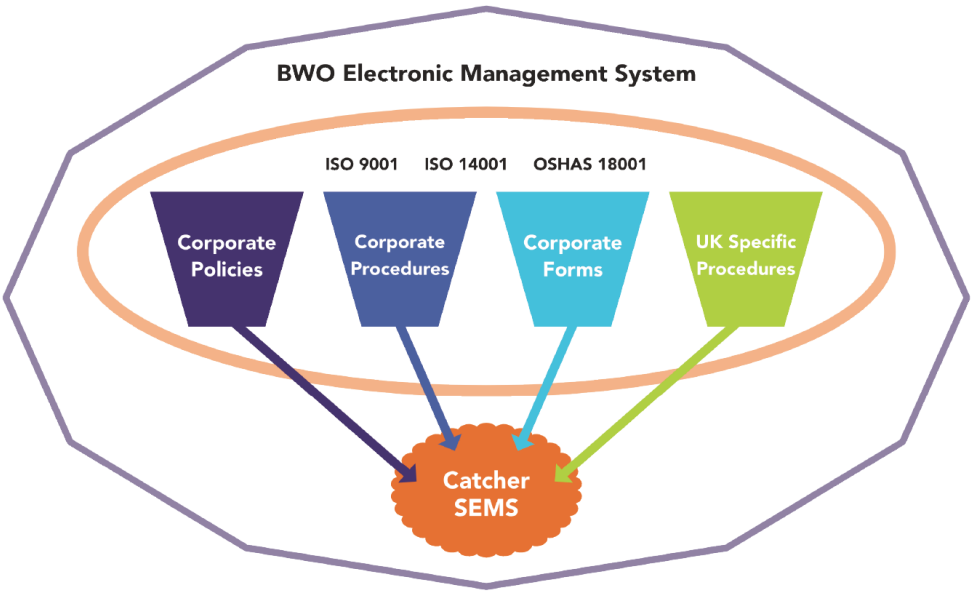

Figure 3-1: **Inputs to BW Catcher MS.**

The purpose of the MS is to provide a framework for the management of all hazards and associated risks generated through the operation of the BW Catcher FPSO.

The basic principal applied within the MS is one of continual improvement in the management of risk, both environmental and health and safety related. In order to achieve this the MS utilises the Plan, Do, Check and Act model

Figure 3-2).

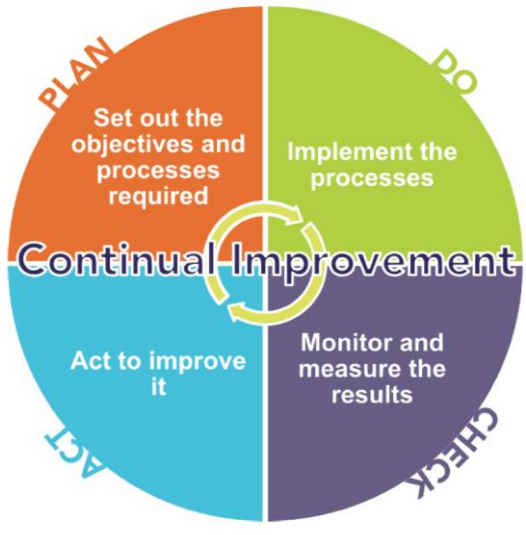

Figure 3-2: **BW Catcher MS Continual Improvement Model.**

4 Environmental Performance

Environmental performance 2023 for the BW Catcher FPSO is detailed in the following sub-sections.

4.1 Oil in Produced Water

During normal production, water is produced when extracting hydrocarbons from the reservoir.

Despite treatment, produced water still contains traces of oil, and as such, produced water discharge is controlled via a permitting system managed by the UK regulatory authority, OPRED.

The 2023 Oil Discharge Permit (OLP/570) held by BWOCUK allows the BW Catcher FPSO to discharge produced water, provided the hydrocarbon concentration is within the limit set out in the permit.

The amount of produced water discharged in 2023 is outlined in

***Table* 4.1**.

***Table 4.1:* Produced water discharge in 2023.**

Month	Produced water discharged (m^3)	Days on stream	Average OiW (mg/L)	Oil discharged (tonnes)
January	0	0	0	0
February	0	0	0	0
March	0	0	0	0
April	0	0	0	0
May	0	0	0	0
June	0	0	0	0
July	0	0	0	0
August	0	0	0	0
September	0	0	0	0
October	0	0	0	0
November	0	0	0	0
December	0	0	0	0
Total	**0**	**0**	**-**	**0**

BW Catcher FPSO was permitted to discharge a total of 244,754 m^3 of produced water during 2023 however the actual volume of produced water discharged to sea during 2023 was 0 m^3.

BWOCUK utilises a produced water re-injection system which when online injects a portion or the full amount of the produced water back into the reservoir as opposed to discharging it overboard.

Table 4.2 overleaf outlines the amount of produced water re-injected during 2023.

Table 4.2: **Produced water re-injected in 2023.**

Month	Produced water re-injected (m^3)	Days on stream	Average OiW (mg/L)
January	406,148.90	31	57.45
February	344,518.20	26	58.96
March	424,866.00	29	57.12
April	400,384.30	29	54.51
May	364,291.60	21	51.95
June	267,149.60	28	55.93
July	422,683.30	31	43.41
August	459,750.20	31	63.32
September	648,512.40	30	51.79
October	1,757.00	1	74.20
November	204,832.80	24	53.50
December	370,513.20	30	50.28
Total	4,315,407.50	311	-

4.2 Chemical Use and Discharge

Various chemicals are used offshore during production operations.

During production operations, chemicals such as scale dissolvers, corrosion inhibitors, demulsifiers and biocides are used to assist with the separation of oil and water, prevent damage to infrastructure such as pipelines, and to prevent 'souring' of the reservoir.

Any chemical used to process hydrocarbons offshore must, in line with the Offshore Chemical Regulations 2002 (as amended), be registered by the Centre for Environment, Fisheries and Aquatic Sciences (Cefas). The chemicals are subject to robust environmental risk assessment and once registered, their use is controlled and monitored through a permit granted by OPRED.

Under the Offshore Chemical Notification Scheme (OCNS), chemicals are ranked according to the assessed hazard to the environment and are given a lettered heading E, D, C, B or A, with E representing the lowest and A the highest hazard category.

Using the Chemical Hazard and Risk Management (CHARM) model, a colouring band is used to show which chemicals pose the highest environmental hazard. These bands are Gold, Silver, White, Blue, Orange or Purple with Gold representing the lowest hazard and Purple the highest.

Some chemicals are regarded as PLONOR (PLO), which means that they have been determined to Pose Little Or NO Risk to the environment.

Any chemicals that carry substitution (SUB) warnings or which pose a risk to the marine environment (determined using criteria from the OPRED) have been justified in the Chemical Risk Assessment (CRA) document that accompanies the production permit.

BW Offshore, it's contractors and chemical suppliers work on a continuous basis to find suitable alternatives to replace the products with SUB warnings.

4.2.1 BW Catcher Chemical Use and Discharge 2023

Sixteen chemicals with substitution warnings (SUB) were permitted for use on BW Catcher in 2023, and these are detailed in *Table 4.3: Chemicals with SUB warnings* **permitted** *in* ***2023.***

Table 4.3: **Chemicals with SUB warnings permitted in 2023.**

Chemical name	Supplier	Status	Replacement status
AFMR20360A	ChampionX (Champion Technologies Ltd)	Used and discharged	Not replaced
ASPH13019A	ChampionX (Champion Technologies Ltd)	Not used or discharged	Replaced
CORR11389A	ChampionX (Champion Technologies Ltd)	Not used or discharged	Not replaced
CORR12452A	ChampionX (Champion Technologies Ltd)	Used and discharged	Not replaced
CORR13966A	ChampionX (Champion Technologies Ltd)	Used only	Not replaced
EMBR13442F1	ChampionX (Champion Technologies Ltd)	Not used or discharged	No longer required
EMBR17904B	ChampionX (Champion Technologies Ltd)	Used and discharged	Replaced
EMBR17904F1	ChampionX (Champion Technologies Ltd)	Not used or discharged	Not replaced
FLOW18395A	ChampionX (Champion Technologies Ltd)	Used and discharged	Replaced
FLOW48395A	ChampionX (Champion Technologies Ltd)	Used and discharged	Not replaced
MEMB00589A	ChampionX (Champion Technologies Ltd)	Used and discharged	Not replaced
NAPH23002A	ChampionX (Champion Technologies Ltd)	Used and discharged	Not replaced
Oceanic HW443 R	MacDermid Offshore Solutions	Used and discharged	Not replaced
PermaTreat PC-191	ChampionX (Champion Technologies Ltd)	Not used or discharged	Replaced
PHASETREAT 6173	Clariant Oil Services	Used and discharged	Not replaced
RX-9022	Roemex Ltd	Not used or discharged	Not replaced

A total of 37 chemicals were permitted for use, with 20 being used and discharged on BW Catcher during 2023. These uses are representative of chemical use quantities required to process hydrocarbons that are produced at BW Catcher.

3,521,100 kg of chemicals were used during 2023 and of that 124,165 kg was discharged during operations in 2023.

Figure 4-11 shows the percentile usage of chemicals permitted during 2023. **Figure 4-2** shows the percentile discharge of chemicals during 2023.

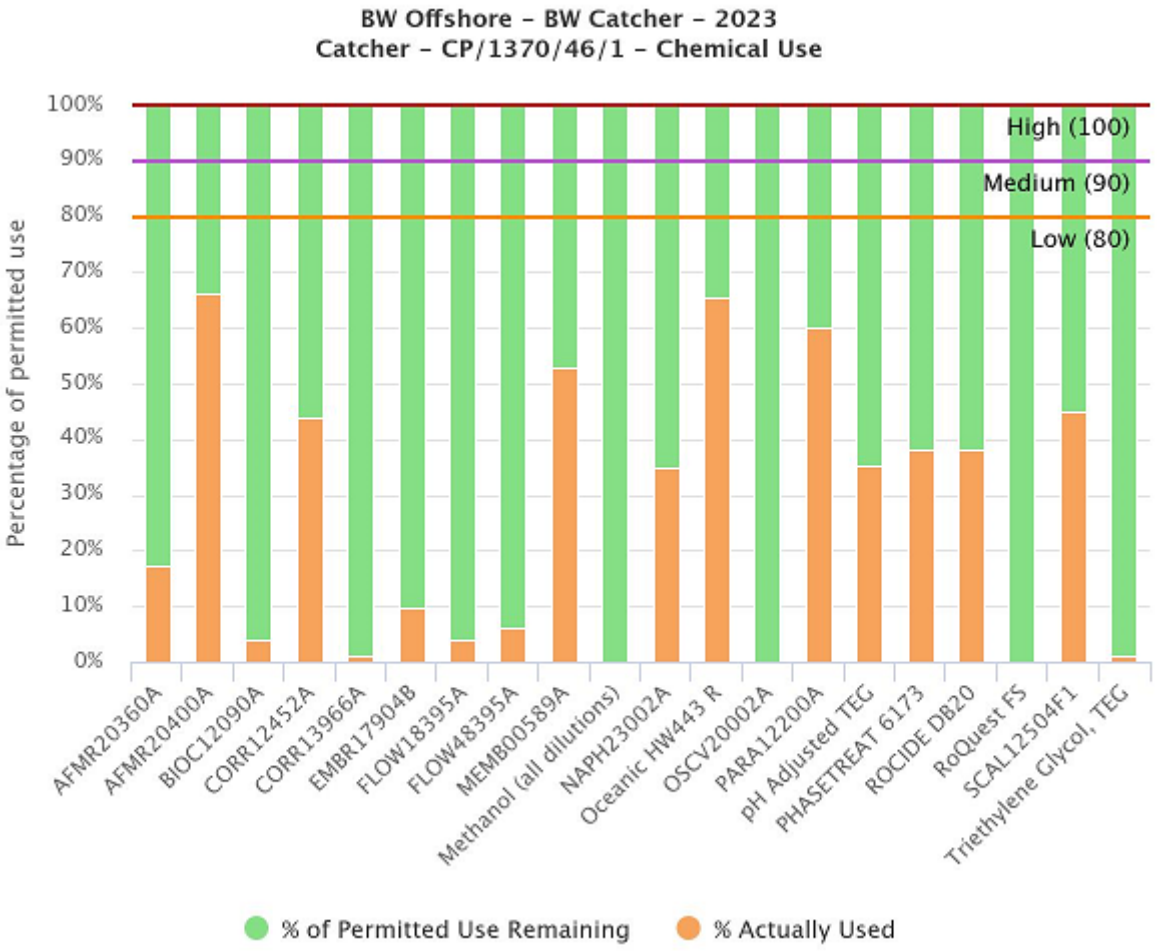

Figure 4-1: **Percentile use of chemicals permitted and used during 2023.**

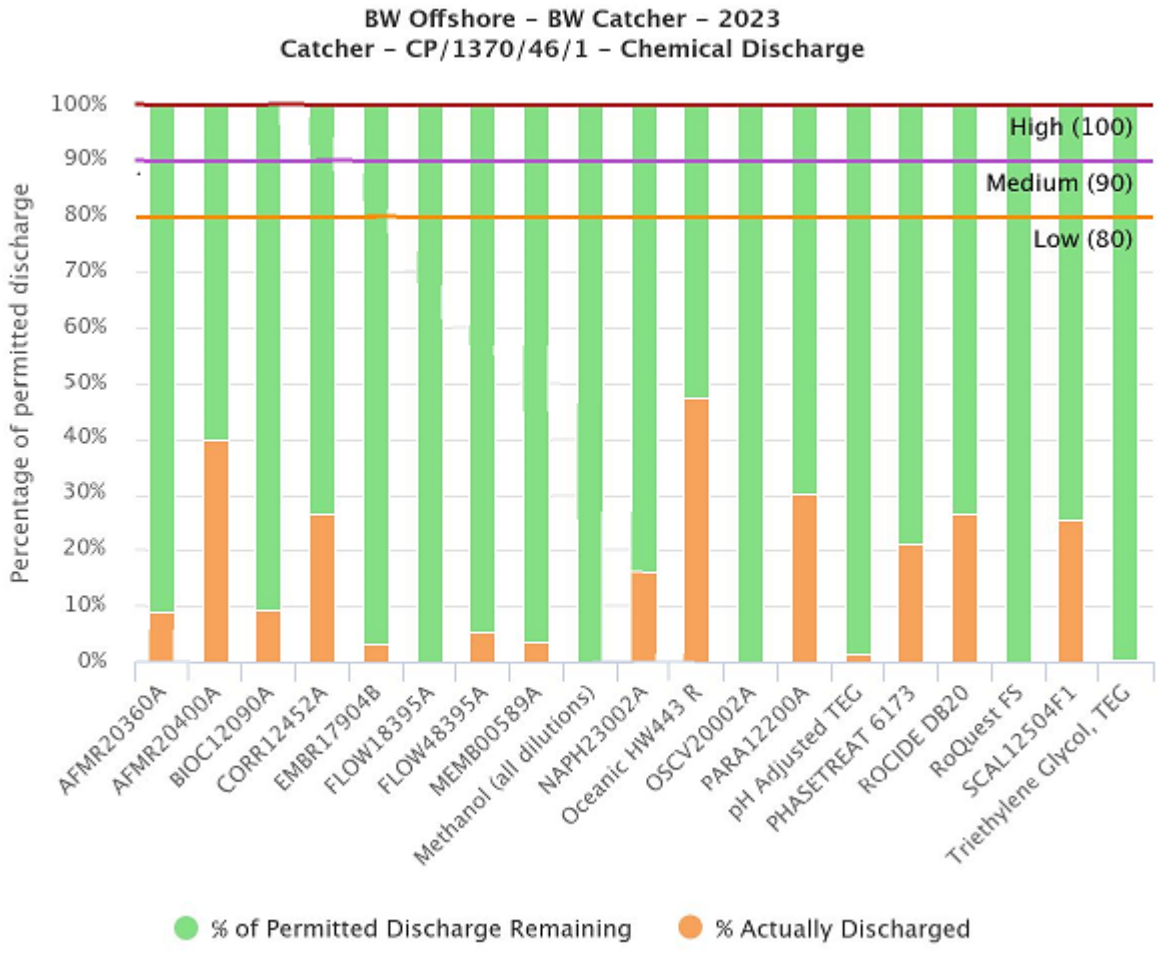

Figure 4-2: **Percentile discharge of chemicals permitted and discharged during 2023.**

4.3 Waste

Waste is generated from offshore operations and is transported onshore for re-use, recycling, treatment or disposal.

Production installation waste is segregated into categories before back-loading. As much waste as possible is sent for recycling. This includes wood, scrap metals, paper/cardboard, glass and plastics.

Waste that cannot be recycled is sent to landfill. Certain types of waste that are harmful to the environment (Special Waste) are sent ashore to be processed and disposed of by licensed handlers in accordance with the relevant legislation.

BW Offshore target areas where the amount of waste generated can be further reduced.

4.3.1 BW Catcher FPSO Waste 2023

A total of approximately 294 tonnes of waste was disposed of from the BW Catcher FPSO in 2023 via the waste management contract. Of the total waste produced, 41% was recycled, 26% was waste to energy, 19% was landfilled and no waste was incinerated or reused. (***Figure 4-3***).

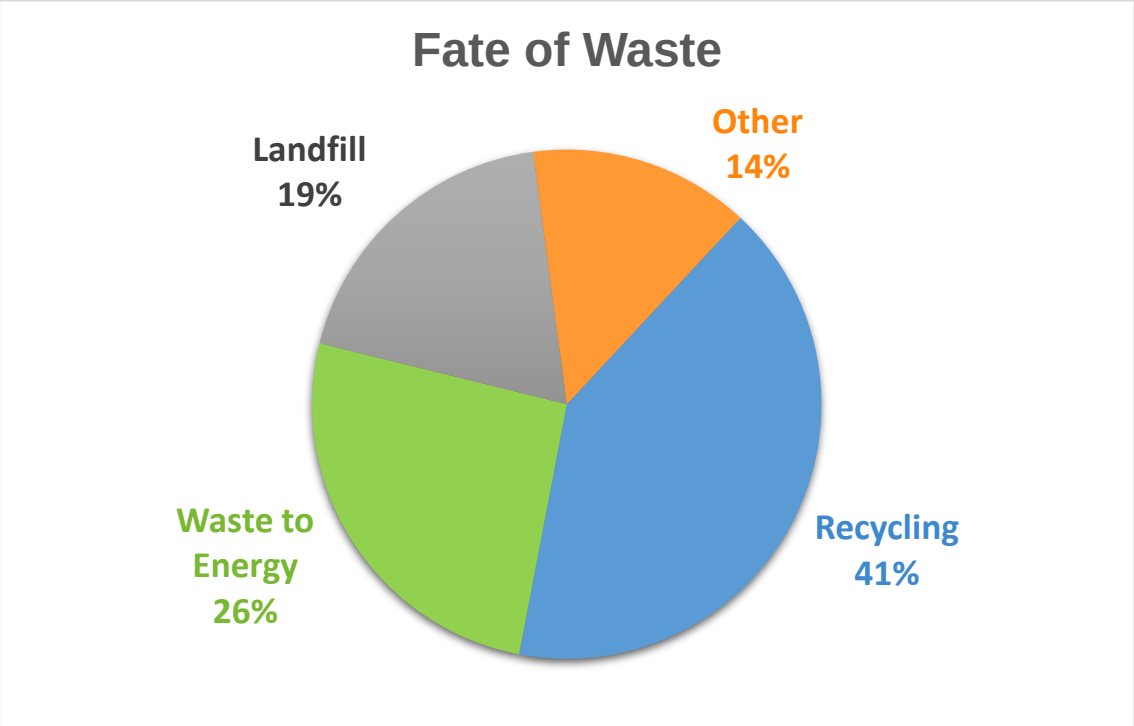

Figure 4-3: **BW Catcher fate of waste.**

4.4 Atmospheric Emissions

Atmospheric emissions arise during offshore drilling and production operations predominantly as a result of fuel combustion for power generation and gas flaring activities.

4.4.1 BW Catcher Atmospheric Emissions 2023

The BW Catcher FPSO is regulated under the Pollution, Prevention and Control (PPC) Regulations as a medium combustion installation. As such, the installation has set limits on atmospheric emissions of nitrous oxides (NO_x), sulphur oxides (SO_x), carbon monoxide (CO), methane (CH_4) and volatile organic compounds (VOCs).

Figure 4-4 shows the combustion emissions (excluding CO_2) for 2023. All emissions were within limits set by DESNZ in the BW Catcher PPC Permit.

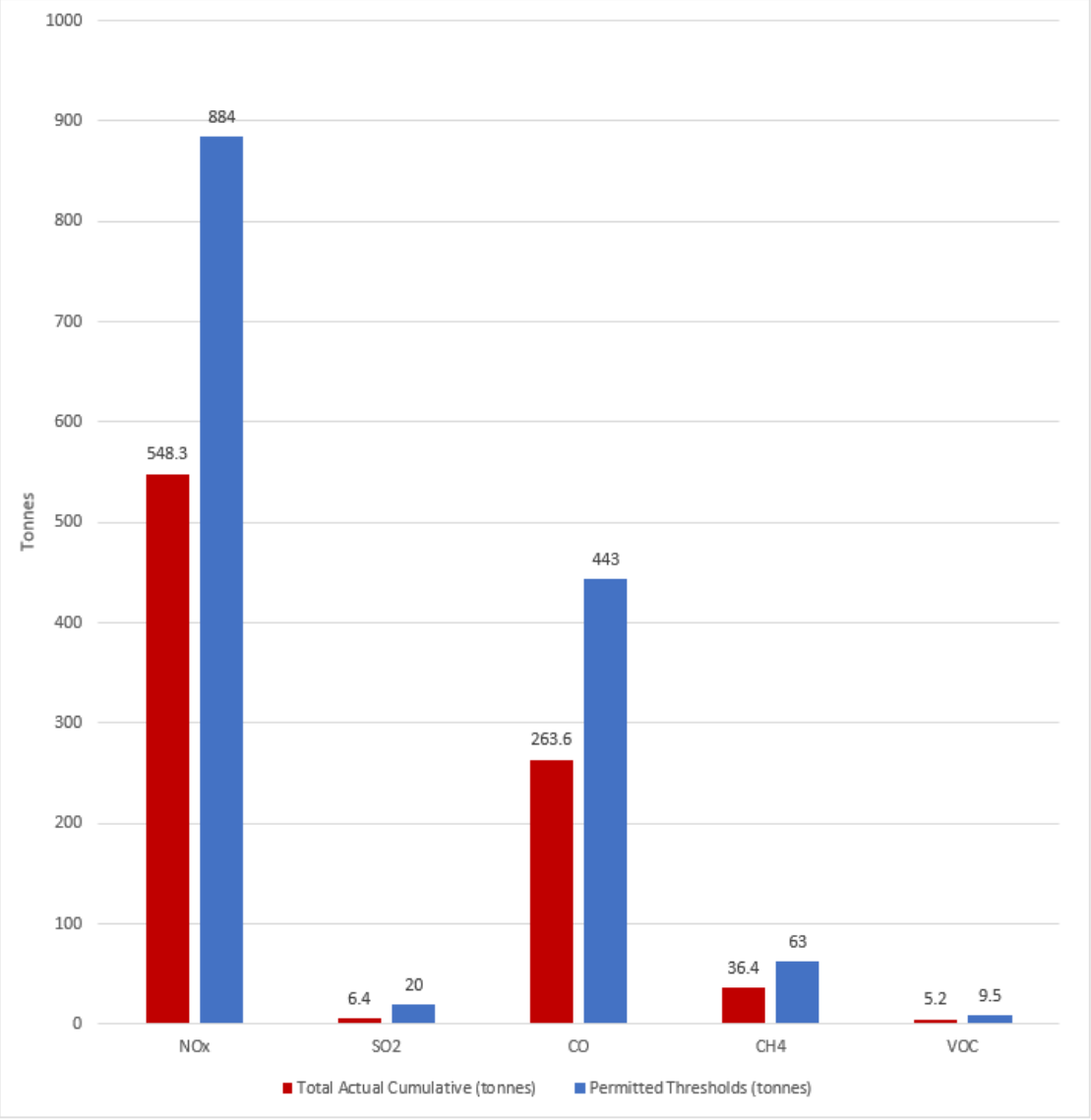

Figure 4-4: **BW Catcher Combustion Emissions.**

BW Catcher FPSO is also regulated under the United Kingdom Emission Trading Scheme (UK ETS) Regulations, which regulate CO_2 emissions for combustion sources, such as turbines and generators.

During 2023, 134,173 tonnes of CO_2 were emitted from combustion activities on BW Catcher FPSO. During normal operations, BW Catcher FPSO runs with two turbines on and as can be seen in

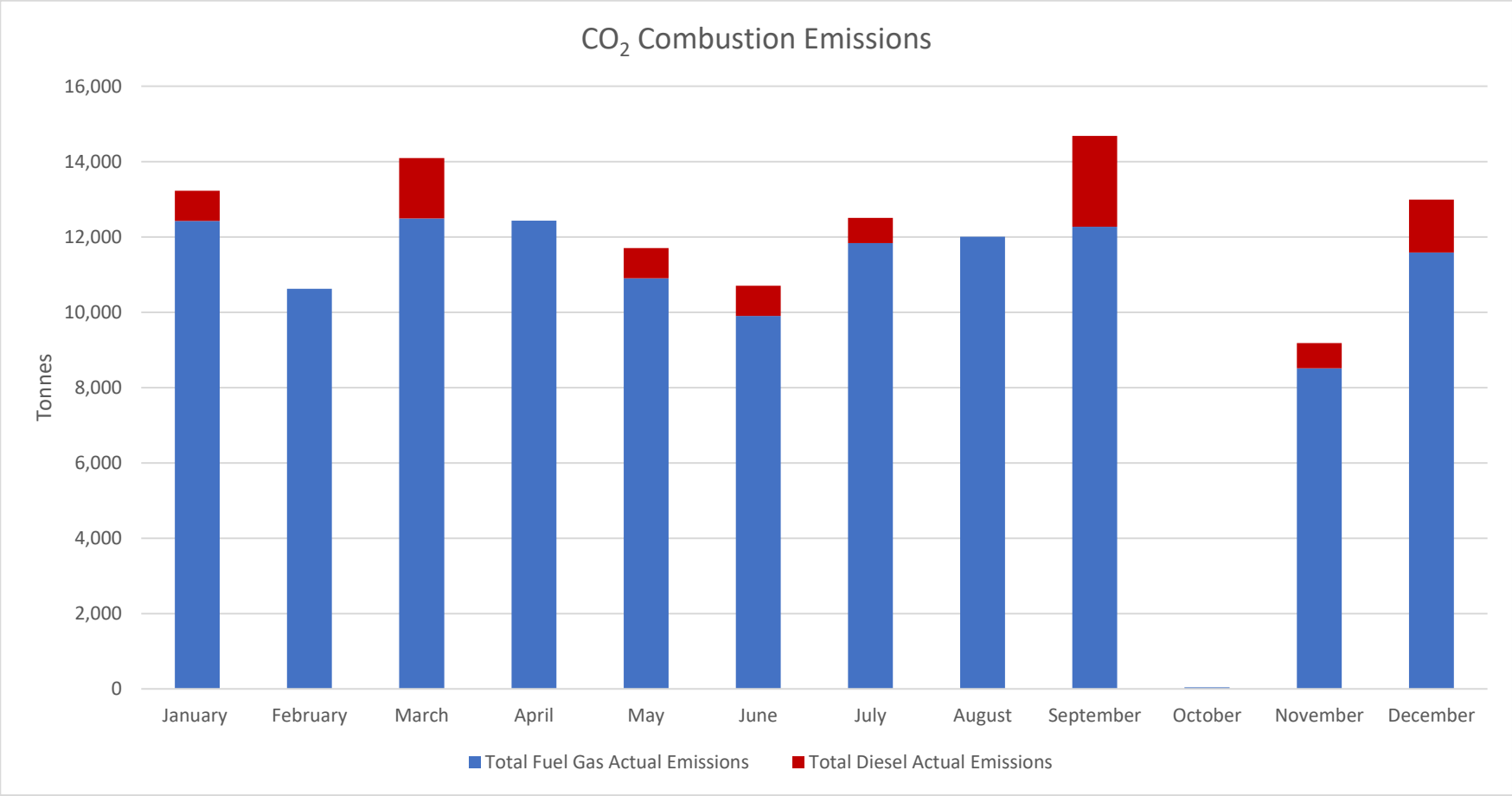

Figure 4-5 the primary source of fuel is from fuel gas (all produced gas would be used as fuel with excess gas being exported), however the turbines can also run on diesel.

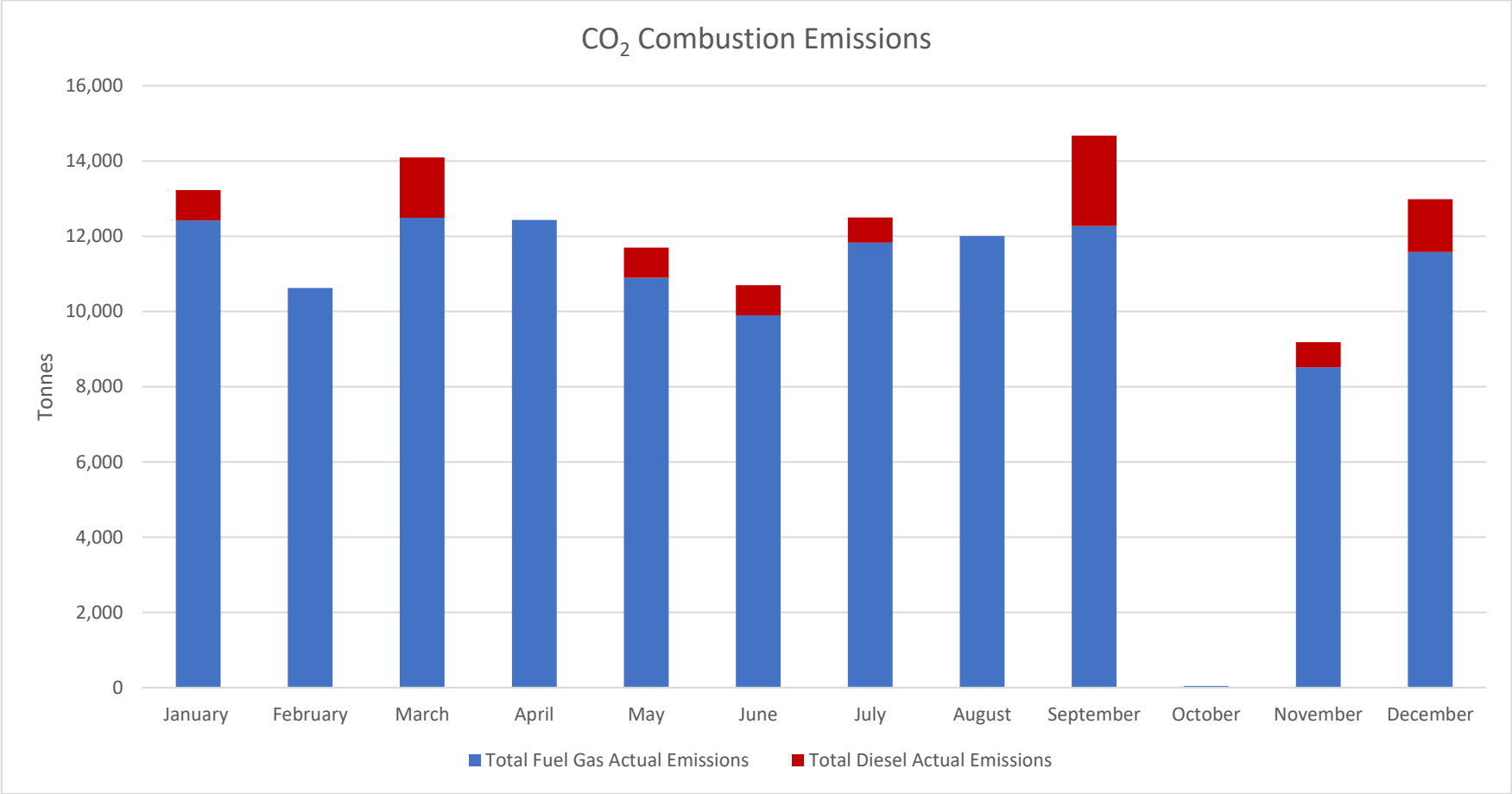

***Figure 4-5*: BW Catcher CO_2 combustion emissions.**

4.4.2 Flaring

The cumulative flaring amount for 2023 was 5,382 tonnes, which is below the permitted amount of 6,424 tonnes. This is displayed in **Figure 4-6**.

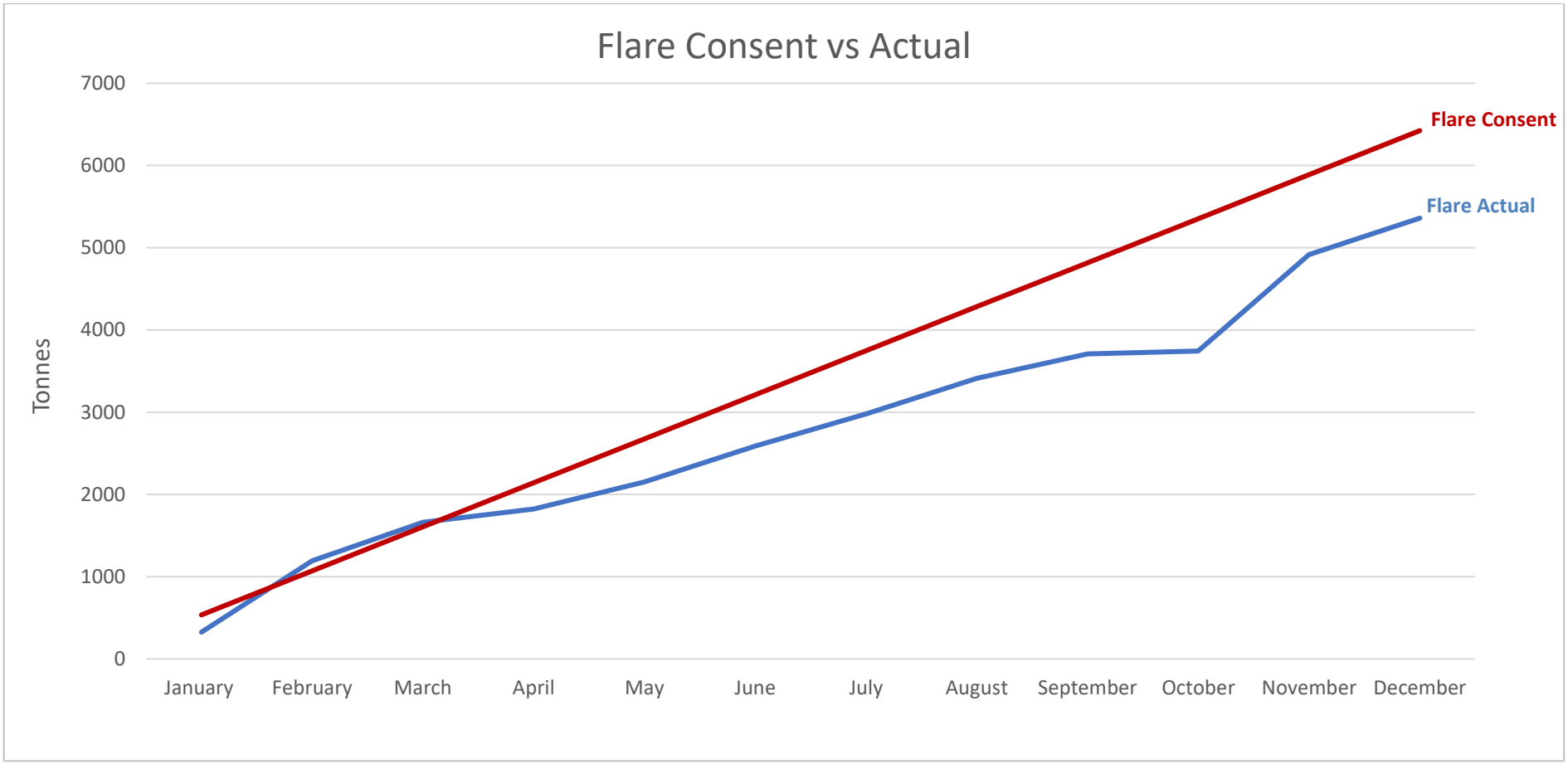

Figure 4-6: **BW Catcher flaring amounts.**

5 Incidents

BWOCUK strive to prevent the unplanned release of hydrocarbons and chemicals, however, on occasion accidental releases do occur. All unplanned releases of hydrocarbons and chemicals to sea from offshore oil and gas installations and pipelines, regardless of size, are reported to OPRED and other statutory agencies via the Petroleum Operations Notice 1 (PON1) form.

A number of processes are in place to prevent unplanned releases and these include planned maintenance of equipment, asset integrity inspections, activity risk assessment, area inspections, routine audits, procedural controls and training and competency for individuals interacting with process plant. Oil Pollution Emergency Plans (OPEPs) approved by OPRED are in place covering the installation. The plan is exercised on a regular basis and followed in the event that an unplanned release does occur, to ensure that the incident is reported in a timely fashion and that contingency and mitigation measures are in place.

5.1 Unplanned Release – PON1

During 2023, one PON1 was submitted to the regulator for an unplanned release from BW Catcher FPSO, as described in **Table 5.1** below.

***Table 5.1*: PON1s submitted during 2023.**

Name/ Description	Regulator tracking number	Release Type	Release Quantity (tonnes)	OPRED Status
Loss of hydraulic fluid. Whilst the stbd crane was being placed in its reast, the deck crew noticed hydraulic oil running from the crane cab onto the deck and into the sea	IRS/2023/3164/PON1	Hydraulic Fluid	0.0155	Processing

5.2 Regulatory Non-Compliance (NC)

Six non-compliances were raised in relation to permit condition breaches, as described in ***Table 5.2*** overleaf.

***Table 5.2*: Non-compliances submitted during 2023.**

Name/ Description	Regulator tracking number	Release Type	Release Quantity (tonnes)	OPRED Status
Day tank topped up with wrong corrosion inhibitor. The corrosion inhibitor which the tank was topped up with was not permitted for use via this route and therefore is a non-conformance against the chemical permit.	N/A	Chemical		Closed
Boiler chemical dose pump tubing failed resulting in a loss of primary containment of fluids containing low concentrations of an oxygen scavenger.	N/A	Chemical		Processing
Hydraulic Oil Leak in Control Panel for Bunker Station. The oil hose connection to the control panel ruptured resulting in hydraulic oil spilling onto the deck.	N/A	Hydraulic Fluid		Processing
Damage to IBC whilst lowering tote tank resulting in a small volume of chemical being released.	N/A	Chemical		Closed
ESD1.1 initiated when leak observed on Catcher flowline chemical injection interface.	N/A	Chemical		Processing
Chemical release to deck from pinhole leak in coagulant pipework.	N/A	Chemical		Processing

6 Revision Summary

Rev.	Date	Document owner to summarise key changes in the document
		Issued for Review (BWO to advise revision)