PERENCO

2020 ENVIRONMENTAL REPORT

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ABBREVIATIONS

BEIS	Department for Business, Energy & Industrial Strategy
BOEPD	Barrels of Oil Equivalent Per Day
CEFAS	Centre for Environment, Fisheries and Aquaculture Science
CHARM	Chemical Hazard and Risk Management
CO_2	Carbon dioxide
CO_2e	Carbon dioxide equivalents
COP	Cessation of Production
EEMS	Environmental and Emissions Monitoring System
ETS	Emissions Trading Scheme
EU	European Union
HC	Hydrocarbon Gases
HQ	Hazard Quotient
JUB	Jack-up Barge
MMCFGD	Million Standard Cubic Feet Per Day
MEG	Mono Ethylene Glycol
MW(th)	Megawatt Thermal
NOV	National Oilwell Varco
NOx	Nitrogen Oxides
NUI	Normally Unattended Installation
OCNS	Offshore Chemical Notification Scheme
OPEP	Oil Pollution Emergency Plan
OPPC	Oil Pollution Prevention and Control
OPRED	The Offshore Petroleum Regulator for Decommissioning & Environment
OSPAR	Convention for the Protection of the Marine Environment of the North-East Atlantic
P&A	Plug and Abandon
PEC:NEC	Predicted Effect Concentration against No Effect Concentration
PLONOR	Pose Little Or No Risk
PUK	Perenco UK Limited
PWRI	Produced Water Re-injection
QSSHE	Quality, Safety, Security, Health and Environment
SEMS	Safety and Environmental Management System
SHARP	Southern Hub Area Rationalisation Project
SNS	Southern North Sea
SO_2	Sulphur Dioxide
UKCS	United Kingdom Continental Shelf
W2W	Walk to Work

PERENCO UK SOUTHERN NORTH SEA

Perenco UK Limited Southern North Sea Operations (referred to hereafter as 'PUK SNS') has been operating in the Southern North Sea (SNS) since 2003 and processes up to 15% of the UK's national gas production. PUK's average daily production in 2020 was approximately 213 mmcfgd (35,473 boepd equivalent) with an additional 300 mmcfgd processed and exported from other producers. 2020 production figures are lower than would typically be expected for a number of reasons such as extensive project and modification work scopes that took place during 2020, meaning compression was shut off and platforms free flowed.

PUK SNS owns and operates the largest infrastructure within the United Kingdom Continental Shelf (UKCS), comprising 43 offshore platforms, 14 subsea wells, and a network of more than 2,400 kilometer (km) of pipelines connected to its two onshore terminals Bacton and Dimlington where the gas is processed, metered and then exported into the UK National Grid.

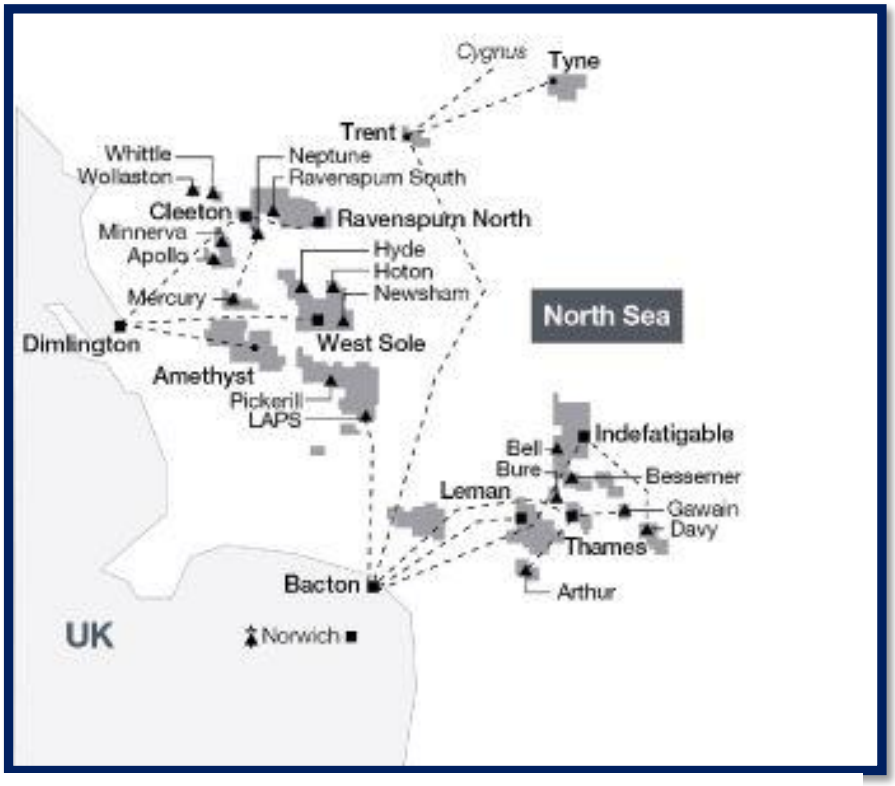


Figure 1. PUK SNS Operations

PUK SNS are responsible for over 10% of the UKCS well stock and have more than 200 wells permanently producing across 40 gas fields; Leman, Indefatigable, Lancelot Area Pipelines (LAPS), Trent, Cleeton including Wollaston, Whittle, Ravenspurn North and Ravenspurn South, West Sole comprising West Sole, Hyde, Hoton and Newsham fields and the Amethyst field, which is now in Cessation of Production (COP).

The Offshore Petroleum Regulator for Environment and Decommissioning (OPRED) requires all operators of offshore installations to produce a Public Statement to report their environmental performance under the OSPAR Recommendation 2003/5 'To promote the Use and Implementation of Environmental Management Systems by the Offshore Industry'. These statements must be prepared on an annual basis, covering offshore installation activities carried out during the previous calendar year, and made available to the public by the 1st June of each year.

This report outlines PUK SNS's offshore environmental performance for its UKCS operations during 2020. Therefore, Bacton Terminal and Dimlington Terminal operations are excluded from this report.

SNS OPERATIONS 2020

In 2020 PUK SNS saw a continued high level of offshore activity. This activity ranged from normal production operations, to platform based well intervention projects, through to decommissioning projects. The following were key permitted project activities undertaken during 2020:

- **Hyde Velocity Strings Well Workover:** Installation of velocity strings to increase production.
- **Pickerill Decommissioning:** Removal of Pickerill A and B topsides**.**
- **Southern Hub Area Rationalisation Project (SHARP):** First stages of the SHARP project completed with the new module installed on 27B.
- **NW Bell Pipeline Repair:** Installation of a new section of pipeline to permanently repair the NW bell pipeline.
- **Subsea Repairs:** Subsea repair work completed on Wollaston and whittle manifolds.
- **Pipeline Stabilisation:** Pipeline remediation and stabilisation deposits for PUK pipelines.
- **Subsea Decommissioning:** Subsea decommissioning of the Thames, Bure and Yare subsea wells.
- **Inde/ Leman free flow:** Compression turned off.
- **Tyne Decommissioning:** Platform dismantlement and removal (Jan 2020).
- **Guinevere:** Platform dismantlement and removal (Jan 2020).

SNS OPERATIONS: PRODUCTION HUB PROFILES

Ravenspurn North (RN) Hub

Fields: Ravenspurn North, Johnston.

Infrastructure and Blocks:

- Ravenspurn North Manned Platform 43/26.
- ST-2 Normally Unmanned Installation (NUI) 43/26.
- ST-3 (NUI) 42/30.
- Johnston Subsea Development 43/27 (third party tie back).

Discovery Date: 1983.

Producing Horizon: Leman Sandstone.

Water Depth: Ranges between 40-47m.

Environmental Protected Areas: Within the Southern North Sea SAC.

Onshore Terminal: Dimlington.

Figure 2. Ravenspurn North Platform

Hub Overview: Gas from Ravenspurn North and Johnston passes to the Cleeton Development, also operated by PUK, via a 24-inch diameter interfield pipeline (PL669) from the Ravenspurn North Platform. At Cleeton, the Ravenspurn North and Johnston gas is commingled with production from Cleeton and associated tiebacks and is exported onshore via a 59 kilometre 36-inch diameter pipeline (PL447) to the onshore Dimlington Gas Terminal.

Figure 3. Cleeton Platform

Cleeton Hub

Fields: Cleeton.

Infrastructure and Blocks:

- Cleeton 42/29.
- Ravenspurn South Alpha (NUI) 42/23.
- Ravenspurn South Bravo (NUI) 42/23.
- Ravenspurn South Charlie (NUI) 42/23.
- Neptune (NUI) 47/04.
- Minerva (NUI) 47/03.
- Whittle subsea development 30/19.
- Eris 47/08 and Ceres 47/09 subsea development (third party tie back).

Discovery Date: 1976.

Water Depth: Ranges between 32.5-50m.

Environmental Protected Areas: Within the Southern North Sea SAC.

Onshore Terminal: Dimlington.

Hub Overview: The Cleeton Development comprises the normally attended Cleeton host facility, which targets the Cleeton gas field, located within UKCS Block 42/29. In addition, the Cleeton Development includes a number of NUIs, subsea developments and associated infrastructure, targeting satellite fields which are tied back to the Cleeton host facility. Gas and condensate are routed to the onshore Dimlington

Gas Terminal located on the East Riding of Yorkshire coast, via a 59 kilometre 36-inch export pipeline (PL447). Produced water is re-injected at the Cleeton host facility.

West Sole Hub

Figure 4. West Sole Alpha Platform

Felds: West Sole.

Infrastructure and Blocks:

- West Sole Alpha 48/6.
- West Sole Bravo (NUI) 48/6.
- West Sole Charlie (NUI) 48/6.
- Hyde (NUI) 48/6.
- Hoton (NUI) 48/7.
- Amethyst A1D (NUI) 47/14 (COP).
- Amethyst A2D (NUI) 47/14 (COP).
- Amethyst B1D (NUI) 47/14 (COP).
- Amethyst C1D (NUI) 47/14 (COP)
- Severn Seas 48/7 (third party tie back).

Discovery Date: 1965.

Water Depth: Ranges between 19.9-34m.

Environmental Protected Areas: Within the Southern North Sea SAC.

Onshore Terminal: Dimlington.

Hub Overview: The West Sole Alpha platform consists of steel legged platforms, which includes process facilities and accommodation and receives gas and fluids from all of the associated tie-backs. Processed gas and some fluids are routed to the onshore Dimlington Gas Terminal located on the Yorkshire coast via a 71.9km 16 inch diameter pipeline (PL28), through the West Sole Alpha platform through a 68km 24 inch diameter pipeline (PL145). COP was received in 2020 for the Amethyst field. Prior to COP gas produced from the Amethyst satellite installations (B1D and C1D) flowed via the Amethyst A1D and A2D platforms and routed through a 47.7km 30 inch diameter pipeline (PL649).

Figure 5. Excalibur NUI

LAPS Hub

Fields: Lancelot, Excalibur, Galahad, Waveney, Malory, and Mordred.

Infrastructure and Blocks:

- Lancelot (NUI) 48/17.
- Excalibur (NUI) 48/17.
- Galahad (NUI) 48/17 (COP).
- Waveney (NUI) 48/17.
- Malory (NUI) 48/12D.

Discovery: 1986.

Water Depth: Ranges between 17-23m.

Environmental Protected Areas: N/A.

Onshore Terminal: Bacton.

Hub Overview: The Lancelot area Pipelines (LAPS) Complex comprises five NUIs, the Mordred subsea well, and associated infrastructure targeting several fields. COP has been received for Galahad and Mordred, and

the Lancelot platform is now shut in. Bacton Gas Terminal receives comingled gas and condensate through the 20-inch gas export pipeline (PL876) via the Lancelot Assembly Tee from the remaining producing installations (Excalibur, Waveney, and the Malory assembly).

Indefatigable (Inde) Hub

Figure 6. Inde 23A Platform

Fields: Indefatigable.

Infrastructure and Blocks:

- Inde 23A 49/23A.
- Inde 23C (NUI) 49/23C.
- Inde 23D (NUI) 49/23D.
- Inde 18A (NUI) 49/18A.
- Inde 18B (NUI) 49/18B.
- Bessemer (NUI) 49/23A.
- Davy (NUI) 49/30A.
- Wenlock (NUI) 49/12A (third party tie back).

Discovery Date: 1966.

Water Depth: Ranges between 25-34m.

Environmentally Protected Areas: Within the North Norfolk Sandbanks and Saturn Reef.

Onshore Terminal: Bacton.

Hub Overview: The Inde Development comprises of one attended installation, seven NUIs and three subsea wells that mostly target the Indefatigable gas field, primarily located within UKCS Blocks 49/18 and 49/23. A number of fields associated with the development are no longer producing, these include the Bessemer, Tristan North West and Beaufort gas fields. Gas and condensate received at the Inde 23A NUI are routed to the Leman 27B platform for processing and compression via the 30 inch diameter infield PL22 pipeline.

Figure 7. Leman 27A Platform

Leman Hub

Fields: Leman / Leman South.

Infrastructure and Blocks:

- 27A 49/27.
- 27B (NUI) 49/27.
- 27C (NUI) 49/27.
- 27D (NUI) 49/27.
- 27E (NUI) 49/27.
- 27F (NUI) 49/27.
- 27G (NUI) 49/27.
- 27H (NUI) 49/27.
- 27J (NUI) 49/27.

Discovery Date: 1966.

Water Depth: Ranges between 22-40m.

Environmental Protected Areas: Within the North Norfolk Sandbanks and Saturn Reef.

Onshore Terminal: Bacton.

Hub Overview: The Leman Development produces from both the Leman and Leman South gas reservoirs. Leman 49/27A is the normally attended host facility and comprises five bridge-linked platforms that house processing and accommodation facilities. Historically compression facilities were present on Leman 49/27A, however these are now positively isolated with the facility now operates in Free Flow mode. Gas and condensate from the Leman and Leman South reservoirs are routed to the onshore Bacton Gas Terminal located on the North Norfolk coast, via a 61 kilometre 30-inch export pipeline. Produced water is routed to 49/27A where it is reinjected into a dedicated disposal well.

Trent and Tors

Fields: Trent, Kilmar, Garrow.

Infrastructure and Blocks:

- Trent (NUI) 43/24.
- Kilmar (NUI) 43/22 (third party tie back).
- Garrow (NUI) 42/25 (third party tie back).

Discovery Date: 1991.

Water Depth: 34m.

Environmentally Protected Areas: Within the Southern North Sea SAC.

Onshore Terminal: Bacton.

Figure 8. Trent Platform

Hub Overview:

The Trent and Tors development comprises of the Trent, Kilmar and Garrow NUIs which produce form the Trent, Kilmar and Garrow fields. Trent acts as the host processing and discharge facility for the associated tie-backs, and exports to Bacton Gas Terminal via the PUK operated East Anglian Gas and Liquids Evacuation System (EAGLES) export pipeline (PL253).

Trent has been shut in since June 2020, also impacting production and compression of Kilmar and Garrow gas.

ENVIRONMENTAL MANAGEMENT SYSTEM

PUK SNS operate under a Safety and Environmental Management System (SEMS), certified to ISO 14001:2015. The PUK SNS SEMS provides a uniform approach to every element of operations across our SNS assets. With regards to quality, safety, security, health and environmental (QSSHE) management the purpose of the SEMS is to ensure that, as far as reasonably practicable, all of the installation's activities are undertaken in accordance with PUK SNS commitment to its QSSHE Policies and are in compliance with all relevant statutory provisions applicable to onshore and offshore operations within the SNS.

SEMS includes PUK SNS and site-specific processes and procedures through which the local business is delivered. The SEMS framework comprises 15 key components which together provide a roadmap to safe, environmentally responsible and reliable operations.

Each of the 15 PUK SNS standards sets out high level targets which must be complied with, a set of actions to be implemented, along with supporting information to provide guidance on implementation.

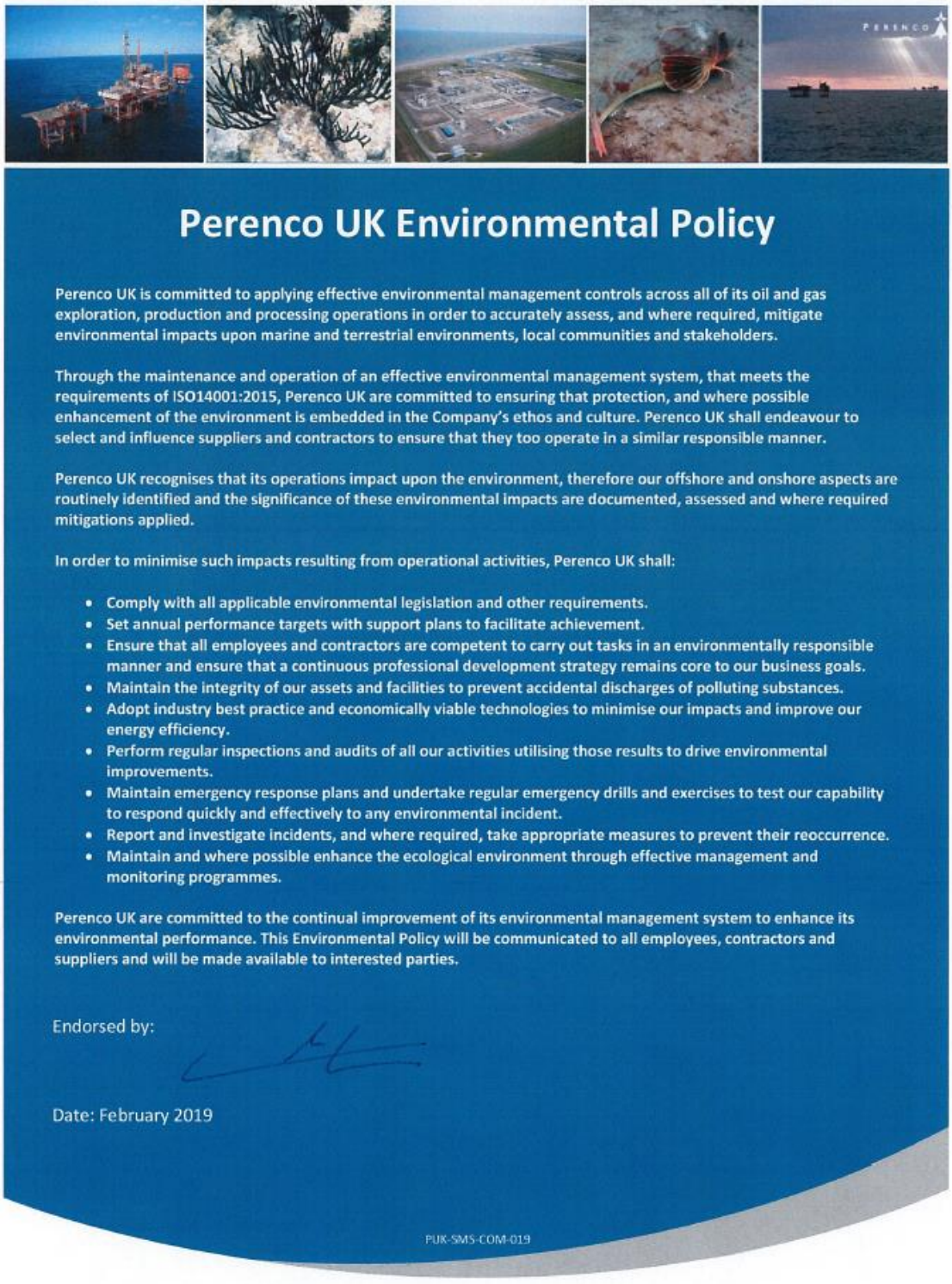
The standards consist of:

1. Leadership and Accountability.
2. Risk Assessment and Management.
3. Compliance.
4. Planning.
5. Personnel Competence.
6. Procurement.
7. Documentation and Communication.
8. Design and Construction.
9. Operations, Maintenance and Management of Change.
10. Emergency Response.
11. Social Responsibility.
12. Performance Monitoring.
13. Unplanned Event (Incident) Reporting.
14. Management System Auditing.
15. Review and Adjustment.

Figure 9. PUK SEMS Homepage

ENVIRONMENTAL POLICY

PUK SNS's Environmental Policy is presented in Figure 10 below. It defines the definition of the PUK SNS significant environmental impacts that are the focus of our environmental management activities.



Perenco UK Environmental Policy

Perenco UK is committed to applying effective environmental management controls across all of its oil and gas exploration, production and processing operations in order to accurately assess, and where required, mitigate environmental impacts upon marine and terrestrial environments, local communities and stakeholders.

Through the maintenance and operation of an effective environmental management system, that meets the requirements of ISO14001:2015, Perenco UK are committed to ensuring that protection, and where possible enhancement of the environment is embedded in the Company's ethos and culture. Perenco UK shall endeavour to select and influence suppliers and contractors to ensure that they too operate in a similar responsible manner.

Perenco UK recognises that its operations impact upon the environment, therefore our offshore and onshore aspects are routinely identified and the significance of these environmental impacts are documented, assessed and where required mitigations applied.

In order to minimise such impacts resulting from operational activities, Perenco UK shall:

- Comply with all applicable environmental legislation and other requirements.
- Set annual performance targets with support plans to facilitate achievement.
- Ensure that all employees and contractors are competent to carry out tasks in an environmentally responsible manner and ensure that a continuous professional development strategy remains core to our business goals.
- Maintain the integrity of our assets and facilities to prevent accidental discharges of polluting substances.
- Adopt industry best practice and economically viable technologies to minimise our impacts and improve our energy efficiency.
- Perform regular inspections and audits of all our activities utilising those results to drive environmental improvements.
- Maintain emergency response plans and undertake regular emergency drills and exercises to test our capability to respond quickly and effectively to any environmental incident.
- Report and investigate incidents, and where required, take appropriate measures to prevent their reoccurrence.
- Maintain and where possible enhance the ecological environment through effective management and monitoring programmes.

Perenco UK are committed to the continual improvement of its environmental management system to enhance its environmental performance. This Environmental Policy will be communicated to all employees, contractors and suppliers and will be made available to interested parties.

Endorsed by:

Date: February 2019

PUK-SMS-COM-019

Figure 10. PUK Environmental Policy

ENVIRONMENTAL IMPROVEMENTS 2020

PUK SNS is committed to continued improvements in environmental performance. In 2020, PUK SNS saw improvements in many environmental Key Performance Indicators (KPIs). Highlights include:

- An overall reduction in CO_2 from 2014-2019, with a significant reduction between 2019-2020. Reductions can be attributed to the shut in of Trent and Tors and free flowing of the Inde and Leman installations for SHARP project.
- All PUK SNS imported electricity for 2020 was from renewable resources.
- Successful diversion of all general and hazardous wastes, within the boundaries of the legal framework, from entering landfill.
- A continued reduction in use and discharge of chemicals by 31% from the previous year.

SHARP

During 2020 the first stages of the Southern Hub Area Rationalisation Project (SHARP) work was completed. Utilising the ERDA Jack-up Barge (JUB) redundant pipework was removed from the Leman 27B platform and new pigging module was installed.

SHARP has and will continue to produce significant environmental benefits through significant reductions of CO_2 emissions by an estimated 100,000 tonnes of by 2021.

2020 has also seen the roll out of improvements aimed at reducing impacts on both the marine and terrestrial environments. An overview of our initiatives are below:

Bird Identification and Management: PUK are building on the work completed last year to help both on and offshore identification of Marine Mammals and Birds. This has been achieved through the implementation of a nesting bird monitoring plan, to increase PUK's understanding and awareness of how they use our platforms.

ENVIRONMENTAL PERFORMANCE 2020

PUK SNS monitors and reports on atmospheric emissions, the discharge of produced water, the use and discharge of chemicals, the disposal of waste, and hydrocarbon/ chemical spill incidents. This section contains the relevant information that was reported via the online Environmental and Emissions Monitoring System (EEMS) for operations during 2020.

Atmospheric Emissions

Carbon Dioxide (EU ETS)

Carbon dioxide (CO_2) emissions from five of our manned offshore installations are subject to control under the European Greenhouse Emissions Trading Scheme (EU ETS) (Amendment) Regulations (2014). Cleeton, Inde, Leman, RN and Trent have EU ETS permits due to the size of the compression/generation capacity and are required to surrender credits to the value of the CO_2 emissions on an annual basis.

During 2020, a total of 199,724 tonnes of CO_2e was emitted from the combustion and venting activities from our offshore assets. Of this 198,536 tonnes CO_2e was from combustion emissions and 190,954 tonnes CO_2 were verifiable emissions under EU ETS. Cleeton, Inde, Leman, RN and Trent account for approx. 96.2% of the offshore CO_2 combustion emissions.

Using the verified EU ETS data PUK SNS are able to demonstrate real reductions in the of CO_2 emissions over time. Figure 11 shows reductions in CO_2emissions from 2014-2020.

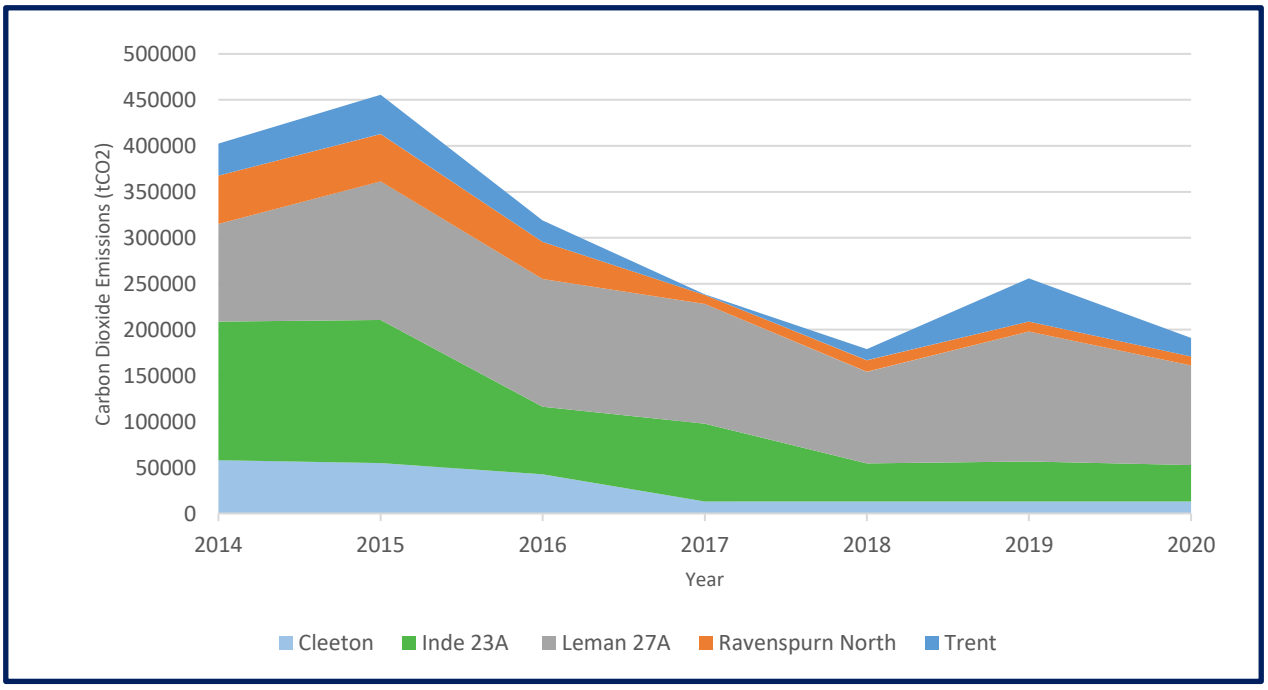


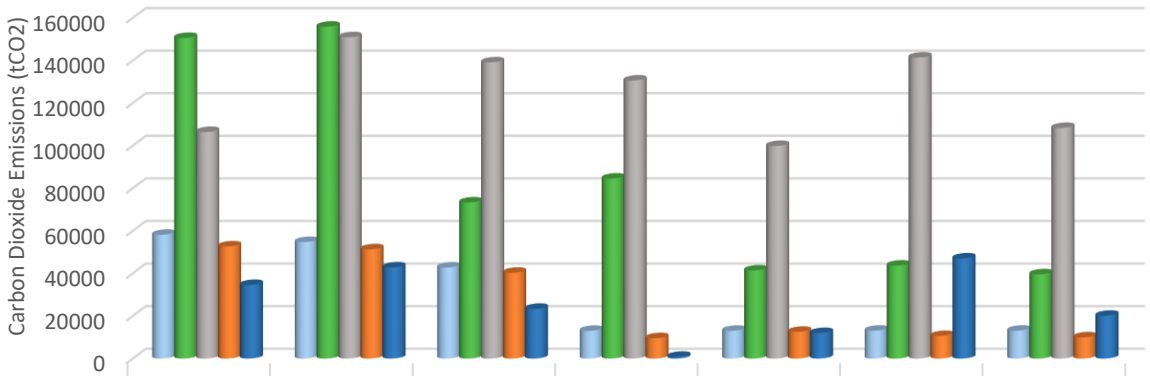
Figure 11. EU ETS Emissions (2014-2020)

PUK SNS operations continue a downward overall trend in CO_2 emissions across our assets with an overall reduction in CO_2 emissions by 25.4% between 2019 and 2020. As displayed in Figure 11, significant decreases in emissions can be seen from the Trent hub. This is due to the shut in of the Trent platform in June 2020. In addition there has been a 23% reduction in emissions generated from the Leman hub largely due to the

current free flowing of Inde and Leman installations prior to the installation of the new compression platform at Leman 27B as part of SHARP.

PUK SNS CO2 Intensity Ratio

Since 2019, PUK SNS has been required to publish detailed CO_2 emissions data in the Director's Report submitted to Companies House, as defined by the Streamlined Energy and Carbon Reporting (SECR) guidelines. As part of this report PUK SNS have established an intensity ratio SECR defined emissions converted to CO_2e/ exported gas (expressed as barrels of oil equivalent (BOE)), in line with the industry norm. The PUK SNS 2019 Base Year intensity ratio was 14.69 kg/ BOE, which has significantly decreased to 12.95/BOE in 2020. The intensity ratio will continue to be used as a measure of performance for CO_2 emissions.



	2014	2015	2016	2017	2018	2019	2020
Cleeton	58134	54706	42750	13009	13029	13090	13087
Inde 23A	150565	155854	73290	84508	41373	43658	39536
Leman 27A	106398	150907	139099	130583	99829	141355	108294
Ravenspurn North	52666	51302	40283	9557	12565	10597	9950
Trent	34554	42784	23352	824	11989	46995	20,087

Figure 12. EU ETS CO2 Emissions by Platform (2014 - 2020)

Key improvements can be seen in PUK's CO_2 emissions, from a total peak in 2014 of **402,317 tonnes** to **190,954 tonnes** in 2020, a reduction of **52.5%**, achieved through;

a. A phased reduction in aviation support.
b. The RADICLE project; removal of compression from the Cleeton and Ravenspurn North Platforms delivering reduction of 90,000 CO^2 emissions.
c. Inde Gas Compression Rationalisation Project.
d. The initial stages of SHARP.

Future projects include the introduction of a mooring buoy and the continuation of SHARP, with an approx. reduction of **100,000 tonnes** CO_2. The timeline below shows the reductions and the future projects.

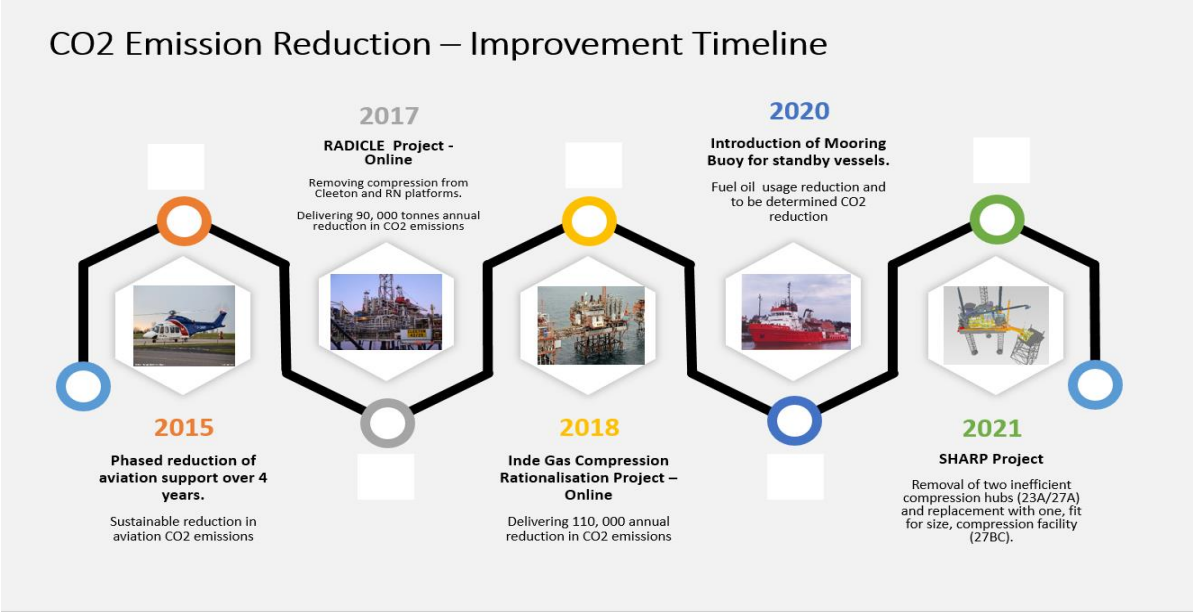


Figure 13. Timeline of CO_2 Reduction Activities

Other Emissions

The environmental impacts of concern attributable to combustion processes also include the emissions to atmosphere of Nitrogen Oxides (NOx). These have the potential to cause health impacts and contribute to acid rain. Offshore receptors are broadly insensitive to the amounts of NOx that are emitted from the combustion of gas. The SNS assets; Indefatigable, Leman and Trent have an installed capacity exceeding 50 MW(th) and are subject to regulatory controls under the Offshore Combustion Installations (Pollution Prevention and Control) Regulations 2013. Figure. 14 outlines the 2020 NOx emissions.

Note: Leman has a considerably higher level of NOx due to the large power generation driving the compression. This is expected to reduced in line with the reduction of CO_2 emissions once SHARP project comes onstream in 2021.

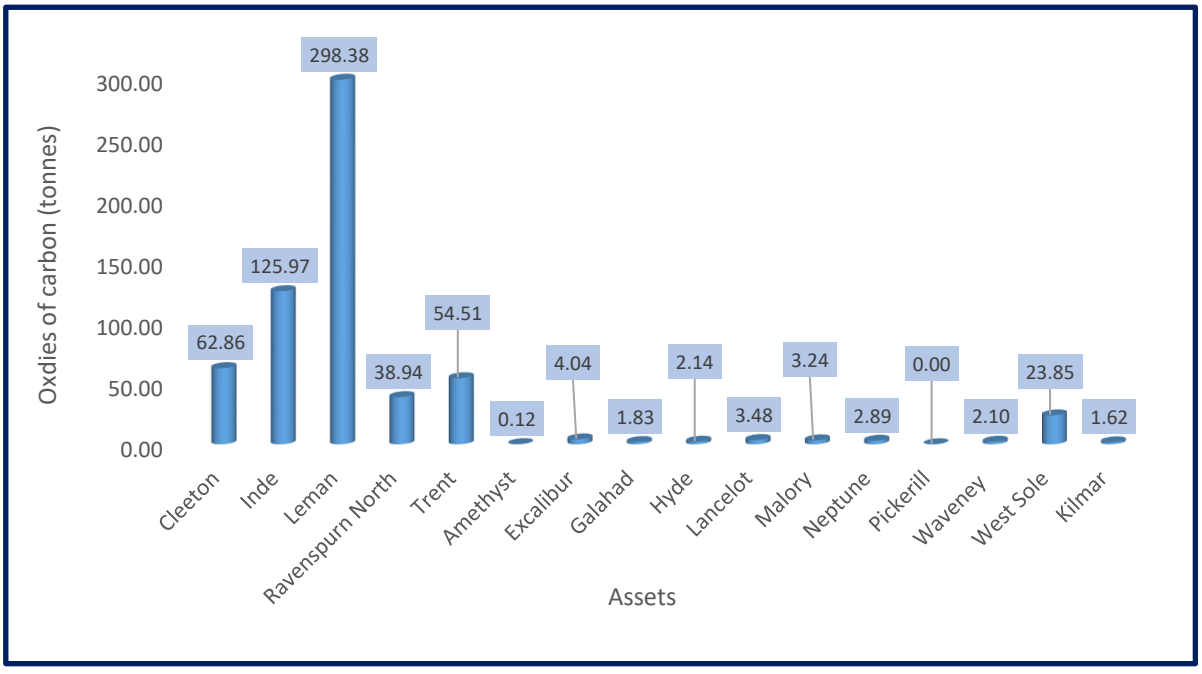


Figure14. Total NOx Emissions per Platform

Waste

In 2020, PUK SNS successfully diverted all general and hazardous wastes* from entering landfill.

This was achieved by working closely with our principle waste management contractor and proactively managing the wastes generated as a result of operational activities by application of the waste hierarchy.

*The only exception being asbestos and asbestos contaminated waste where 1.4 tonnes have been disposed of via licenced landfills during 2020. This is however the required disposal route for such wastes.

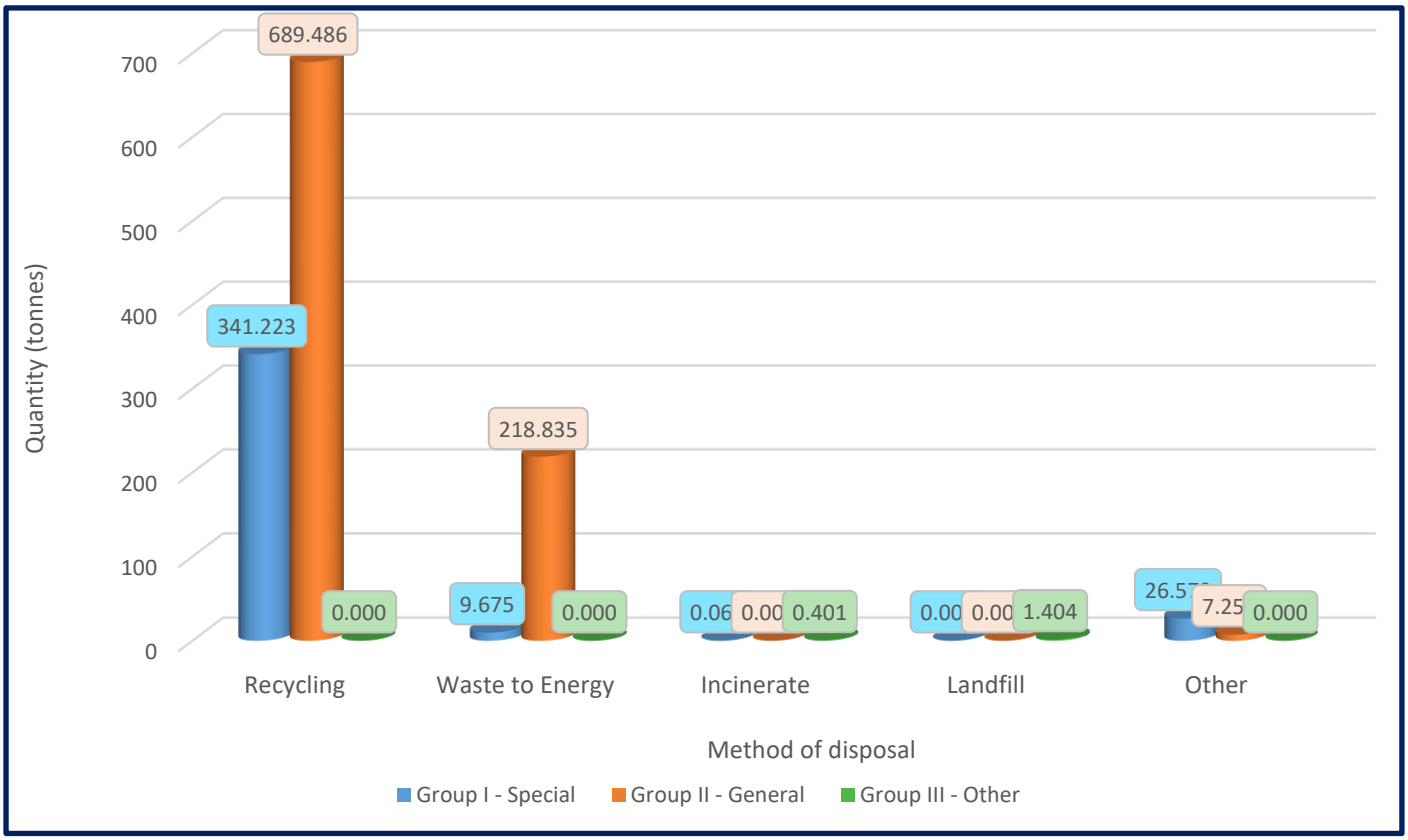


Figure 15. Total Operational Waste 2020

Operational Waste by Manned Platforms

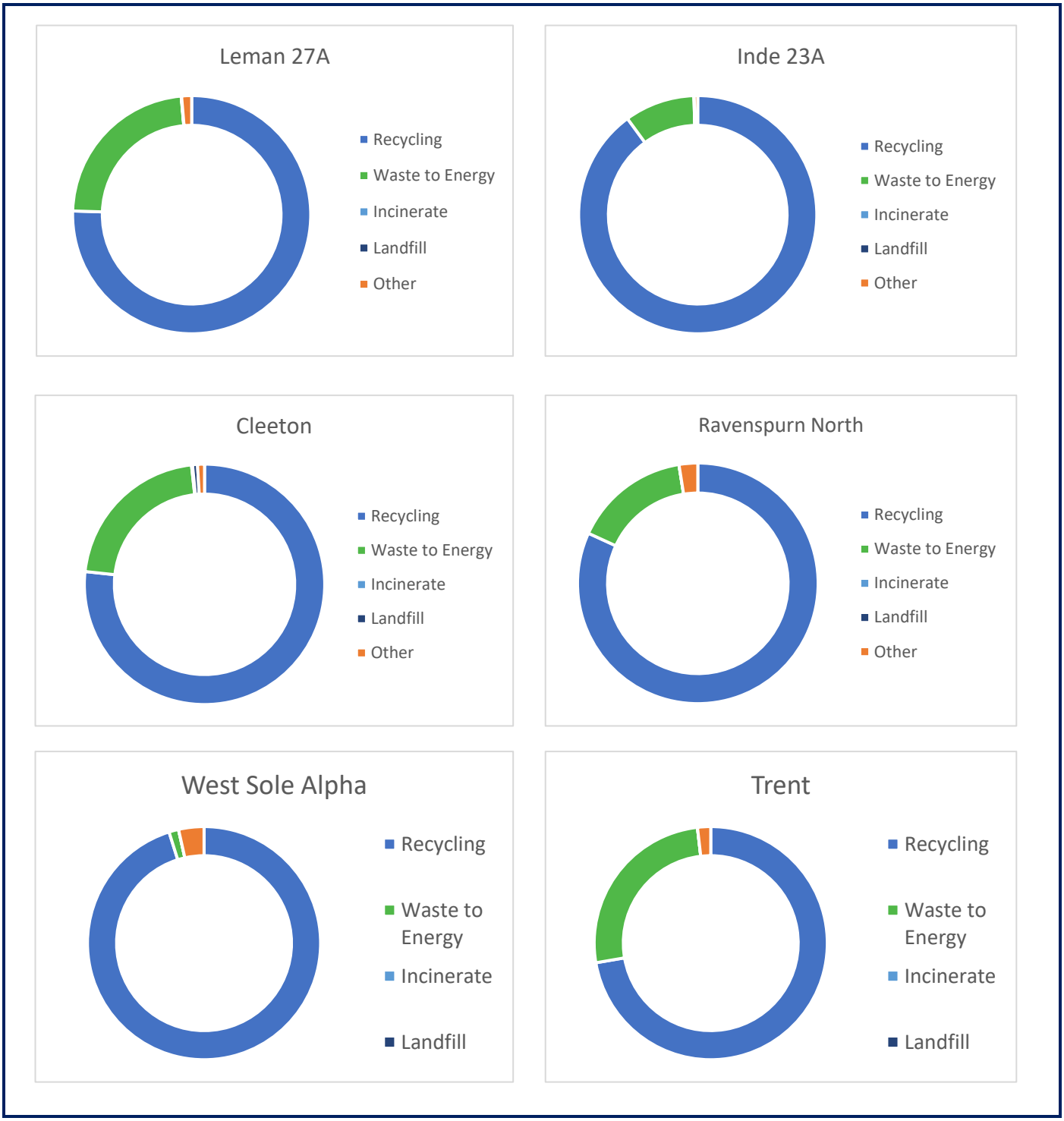


Figure 16. Total Operational Waste and Disposal Method by Manned Platforms 2020

Decommissioning Waste

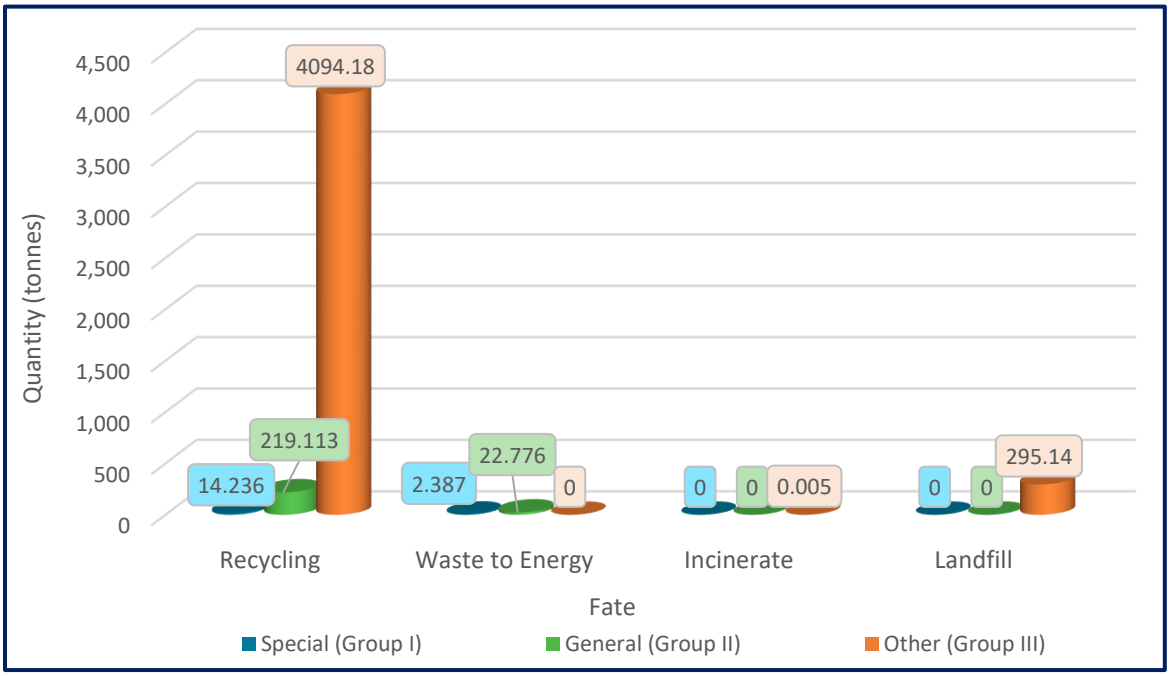


Figure 17. Total Produced Waste from Decommissioning Operations 2020

Decommissioning waste was generated during the Tyne and Guinevere dismantlement work completed by the Blue Tern Heavy Lift Vessel and Pickerill A and B decommissioning, during which dismantlement preparation was completed and both platform the topsides were removed, utilising the Energy Endeavour JUB throughout. The Tyne, Guinevere and Pickerill installations, once removed, were transported to the Netherlands under the International Waste Shipment permit, for recycling and recovery.

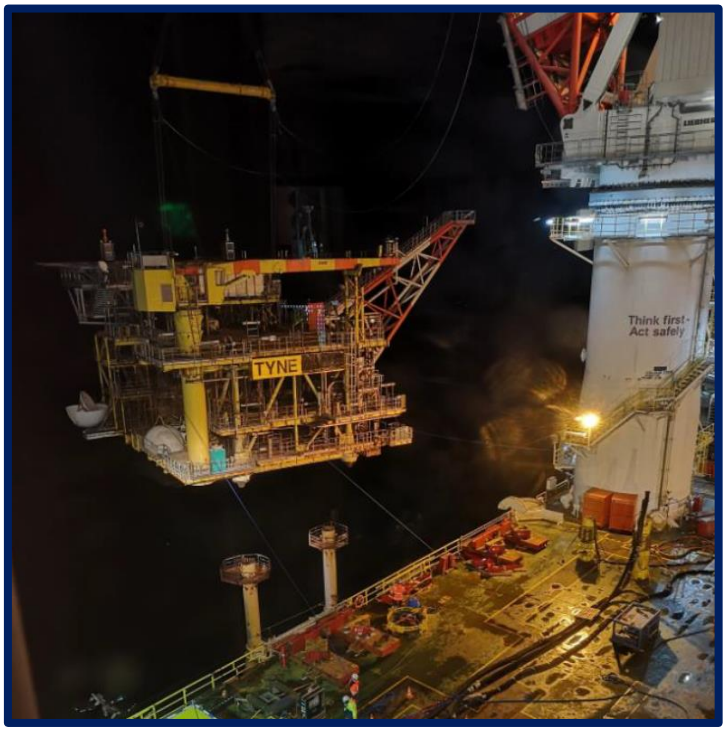
PUK SNS successfully diverted all general decommissioning wastes from entering landfill. The exception to this is hazardous wastes generated through the dismantlement of the Tyne, Guinevere and Pickerill installations, which makes 6.33% of the total waste, which will be disposed of via licenced landfills by the dismantlement yard.

Tyne and Guinevere Decommissioning

In January 2020 decommissioning of the Tyne (44/18) and Guinevere (48/17) platforms was completed.

Following the completion of the hydrocarbon free campaigns in 2016 and 2017, the installations were removed, utilising the Blue Tern heavy lift vessel.

Both installation topsides and jackets were dismantled and offloaded at the Hoondart quay, Netherlands, under the International Waste Shipment permit, for recycling.



Other Waste

Additional waste was generated through platform and project support units and vessels such as the Erda JUB, which supported the first stage of the SHARP project at Leman 27B.

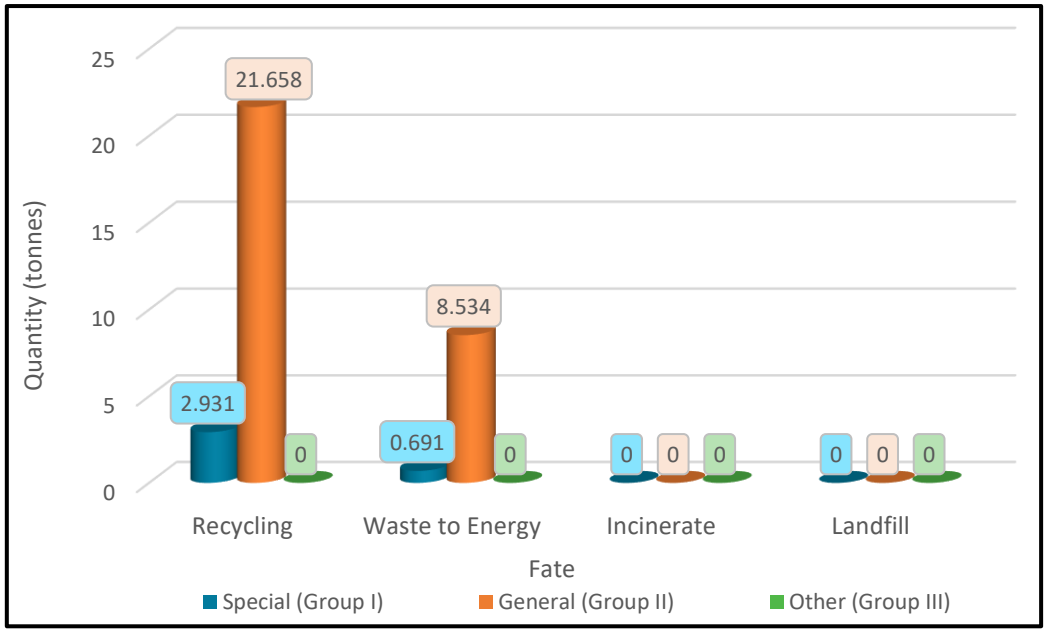


Figure 18. Annual operational waste from 2020

Chemical Use and Discharge

The use and discharge of chemicals is subject to control under the Offshore Chemicals Regulations 2002 (as amended). This requires regulatory approval following an assessment of the predicted environmental impacts of any proposed discharges. In addition, only chemicals that have been registered by the Centre for Environment, Fisheries and Aquaculture Science (CEFAS) may be used.

All chemical products used offshore undergo a hazard assessment, using the Chemical Hazard and Risk Management (CHARM) model, to calculate the ratio of Predicted Effect Concentration against No Effect Concentration (PEC:NEC). This is expressed as a Hazard Quotient (HQ), which is converted to a colour banding (Purple, Orange, Blue, White, Silver and Gold, in order of environmental hazard level (highest to lowest)) and used to rank the product. Products that are not subject to CHARM modelling (i.e. inorganic substances, hydraulic fluids or chemicals used only in pipelines) are assigned an Offshore Chemical Notification Scheme (OCNS) grouping, A - E. Group A includes products considered to have the greatest potential environmental hazard and Group E the least. As seen from Table 1 below, PUK SNS strive to use chemicals which are as friendly to the environmental as possible.

			TOTAL USAGE (KG)	TOTAL DISCHARGE (KG)
NON-CHARM MODEL CHEMICAL CATEGORISATION	A	HIGH HAZARD	0	0
	B		0	0
	C		0	0
	D	POSES LITTLE OR NO RISK	51,546	51,546
	E		1,085,060	10,733
CHARM MODEL CHEMICAL CATEGORISATION	PURPLE	HIGH RISK	0	0
	ORANGE		0	0
	BLUE		0	0
	WHITE		0	0
	SILVER		50,973	774
	GOLD	LOW RISK	63,138	11,578

Table 1. Chemical Use and Discharge Quantities According to OCNS Category (2020)

In 2020, PUK SNS used a total of 1251 tonnes of chemicals, of which 75 tonnes were discharged. The usage of chemicals over the last 5 years has seen an overall downward trend. This is due to a combination of factors: removal of a number of platforms during decommissioning automatically reducing the volume of chemicals used; removal of the need to constantly inject large quantities of chemicals such as Monoethylene Glycol (MEG) and replaced it with far smaller amounts of corrosion inhibitor; and a move away from continuous dosing and use more infrequent batch dosing, where technically feasible to do so.

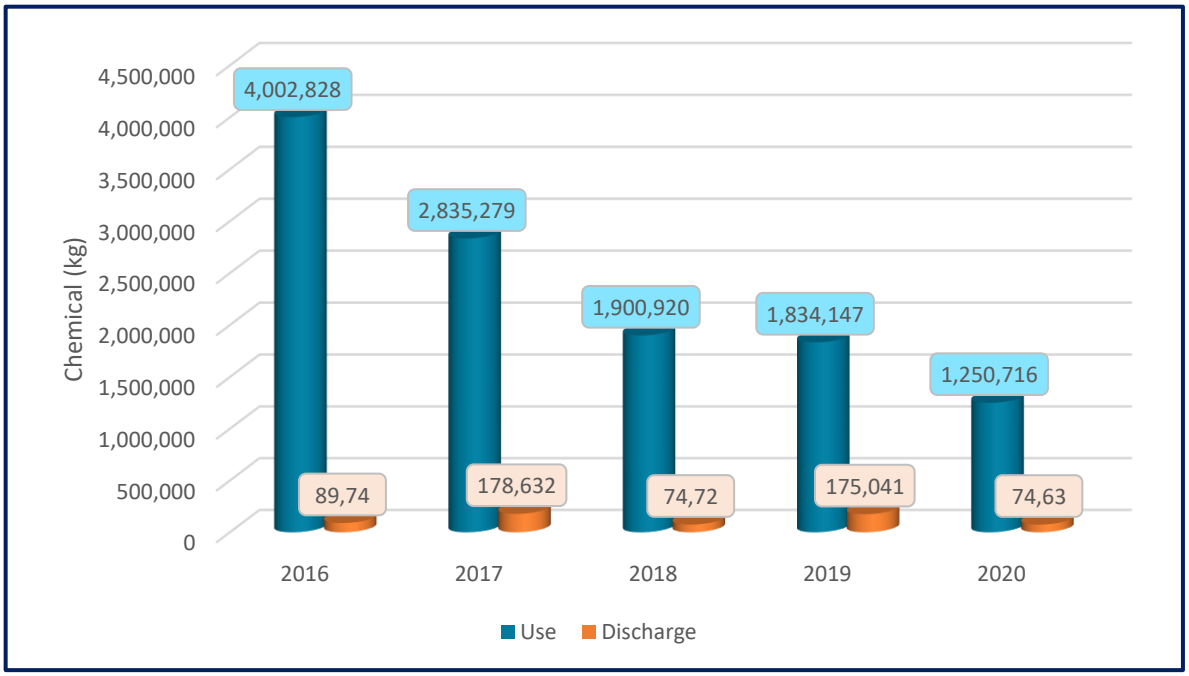


Figure 19. Annual Chemical Usage and Discharge 2020

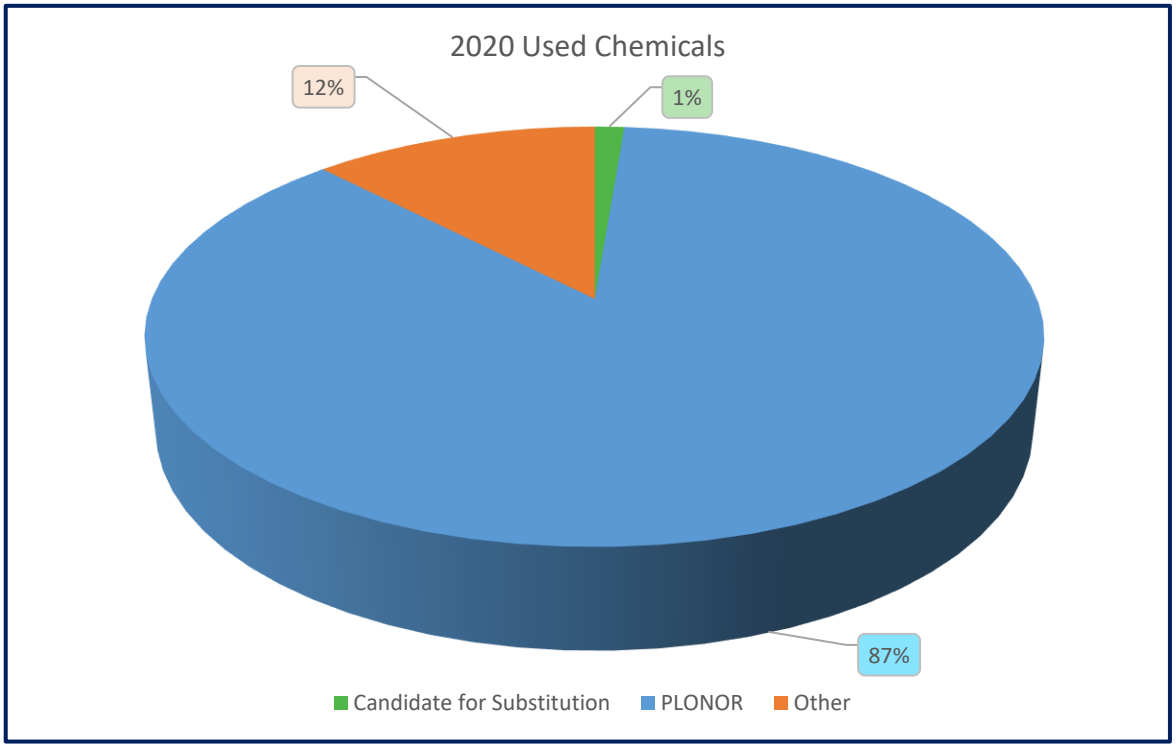


Figure 20. Chemical Usage by Category 2020

During 2020, 86.5% of the chemicals used in production operations pose little or no risk (PLONOR). Only 6 chemicals (1.3% of the total) identified as candidates for substitution were used in production operations.

PUK SNS is continuing to reduce chemical use at our SNS production assets, focusing on phasing out the use and discharge of chemicals with substitutional warnings and a programme of compatibility testing is ongoing to facilitate this.

Decommissioning Chemicals

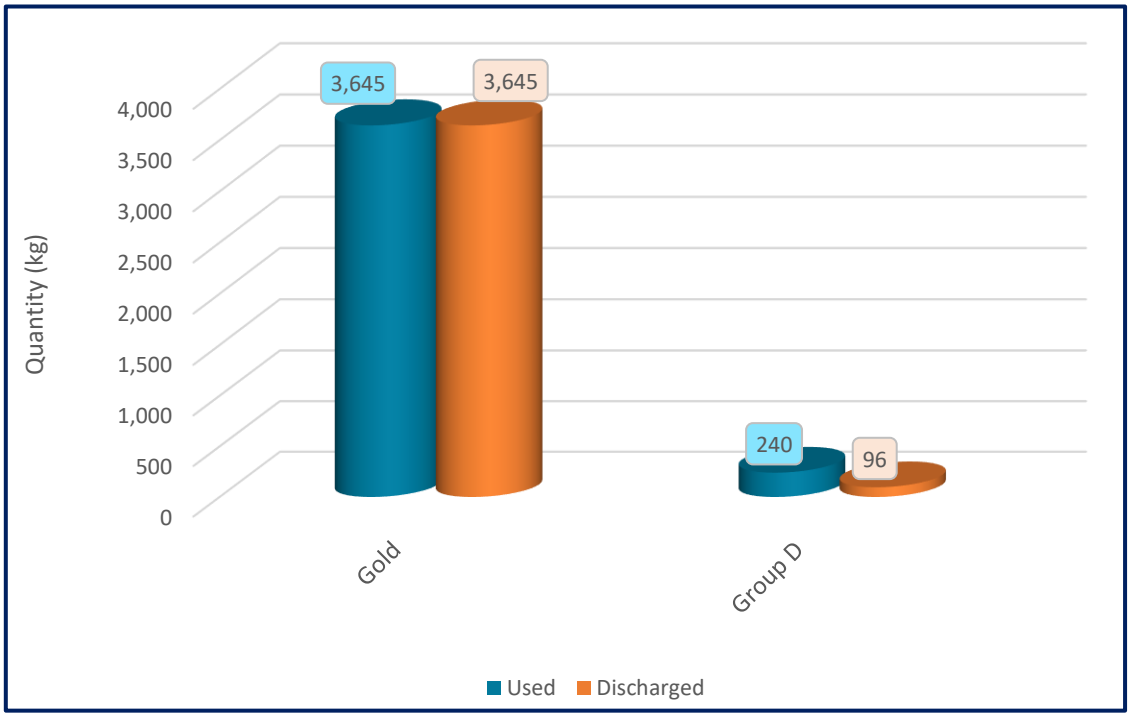


Figure 21. Decommissioning Chemical use by Grouping 2020

A total of 3.9 tons of chemicals were used for decommissioning operations during 2020. Of this 3.7 tonnes were discharged to sea (96%).

Pickerill hydrocarbon free campaigns were completed in 2019, with 2020 decommissioning work consisting purely of dismantling works. Therefore, the only chemicals used during 2020 decommissioning projects were rig maintenance chemicals (rig wash and jacking grease), which accounts for the high proportion of discharge.

The chemicals used were designated as either OCNS Gold band (93%) or group D (7%).

Oil in Produced Water

The discharge of oil is subject to control under the Oil Pollution Prevention and Control (OPPC) Regulations 2005 (as amended). After treatment, oil in produced water was discharged from 9 of our operated assets in the SNS. The volume of produced water discharged from each asset during 2020 is presented in Figure 23 **and** the monthly flow-weighted average concentration of oil in produced water for each asset, along with the consented limit, are presented in Figure 24.

Figure 22 shows an increase in the oil discharged in 2020 in comparison to previous years (2018 and 2019). This increase is primarily due to exceedances at Excalibur and Inde (Figure 24) caused by issues with the water handling equipment and is further described in the installation specific sections below. Improvements or alternative methods for the handling of these installations produced water have been implemented to prevent future exceedences.

Please Note: Produced water re-injection (PWRI) systems are installed at Cleeton and Leman, meaning all produced water is re-injected into dedicated PWRI wells. The facility for discharge to sea remains available should issues arise with PWRI wells. PWRI systems are also available on Amethyst, however the field has now received COP.

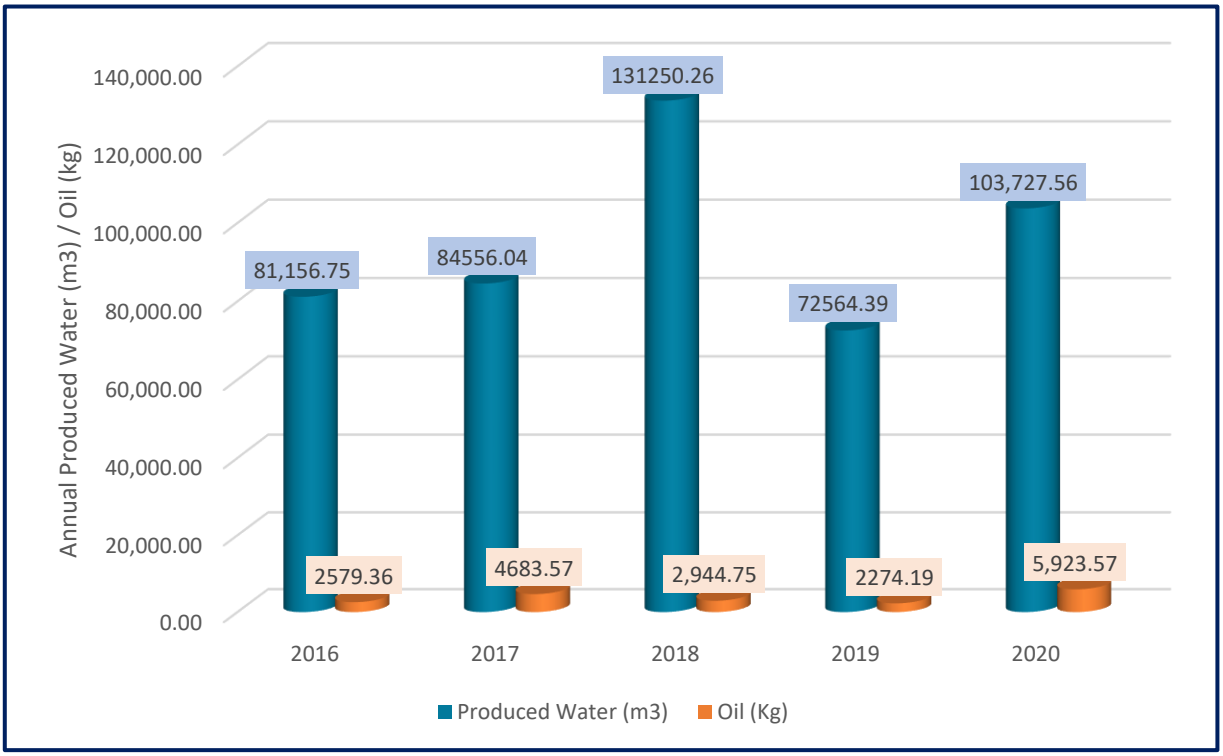


Figure 22. Annual Oil Discharged 2020

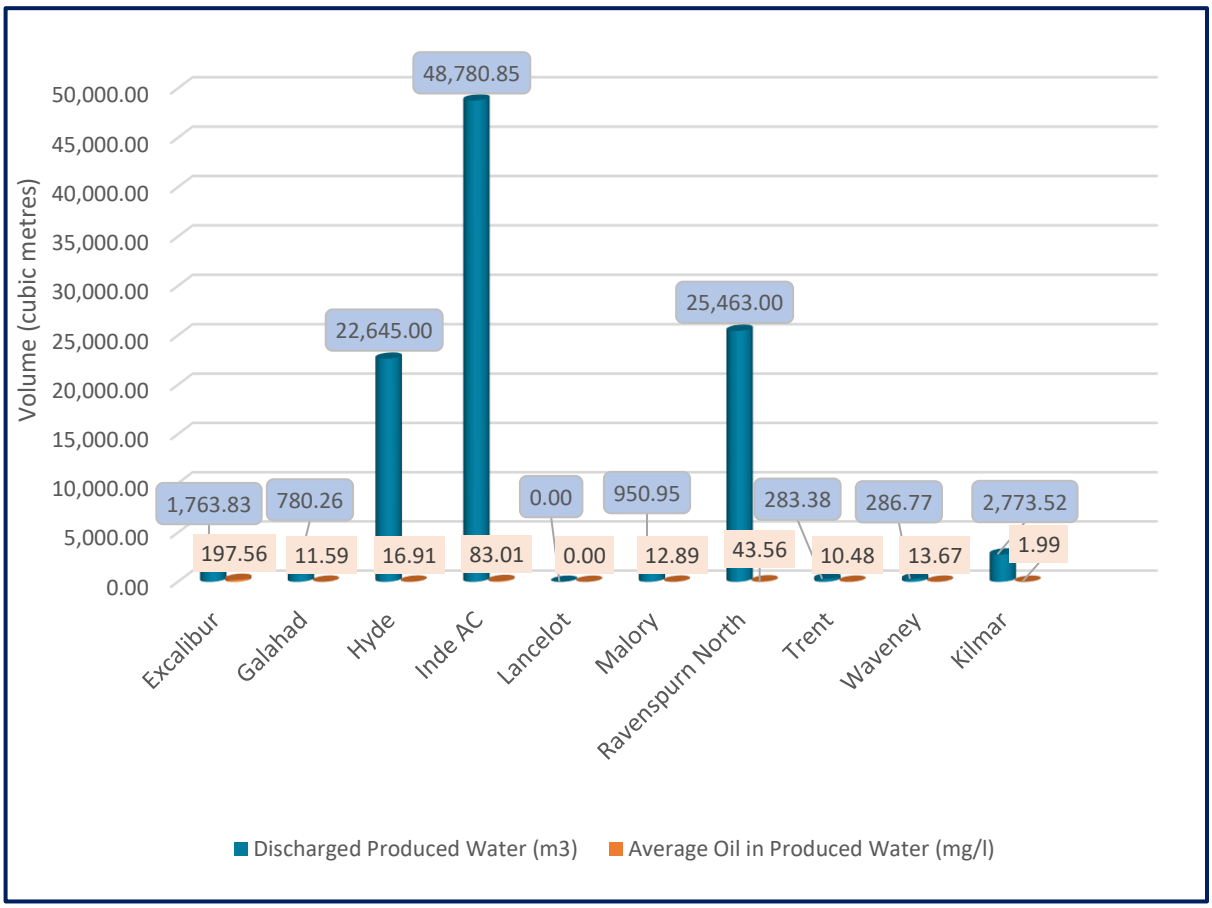


Figure 23. Produced Water and Oil discharge by Asset 2020

During 2020, the monthly flow-weighted average concentration of oil in produced water for the majority of our SNS assets was below the consented limit (30 mg/l). However, this limit was exceeded at three of our assets (Excalibur, Inde and Ravenspurn North). The reasons for these exceedances are provided below

Excalibur

Solids were initially identified as blocking an outlet line to a flowmeter and a Level Control Valve (LCV-34001). Further investigation following breaking of containment on an additional visit found the solids to be sand. Further visits were completed to fully investigate and resolve the issue; however, the blockage was unable to be cleared. Following receipt of a high oil in produced water result in August (700mg/l) Perenco has decided to transfer all fluids via the export pipeline to the receiving terminal. There will be no overboard discharge until the blockage can be resolved.

Inde

Normal operations of the water handling unit were affected by the reintroduction and line sweeping of a platform well which impacted the filtration of produced waters. Monitoring of scrubber levels and backing off wells was completed to maintain a steady flow to the water handling system, and control of the water handling unit was steadied out.

Ravenspurn North

Normal operation for the RN hub is to process all produced water through the Ravenspurn North system, however both Ravenspurn North and Johnson have historically discharged produced water which was a far higher level than the 30 mg/l limit set in the permits.

Perenco have implemented an oil in produced water management plan on Ravenspurn North, and throughout 2020 trials and monitoring have been completed to establish the cause for the hubs traditionally high oil in produced water levels. Process optimisation and operational changes, which form part of the management plans mid-term solutions, have resulted in measurable improvements to hub's average oil in produced water, reducing from 67.95 in 2019 to 43.56 in 2020. Perenco are further progressing their long-term solution to further improve compliance over 2021.

Accidental Releases

As spills at sea can have consequences for the marine environment, PUK SNS work to minimise the risk with a focus on prevention. We have BEIS OPRED approved Oil Emergency Pollution Plans (OPEPS) in place across all our assets, alongside regular drills and training undertaken to prevent accidental releases.

The Oil Pollution and Control Regulations apply to hydrocarbon and chemical spills to sea. Spills must be reported, and where required, subject to a detailed investigation to ascertain the cause and prevent recurrence. In addition to spills originating from PUK assets, PUK submit 3rd party PON1 notifications, however these are not included within PUK accidental releases.

A total of 16 spills from PUK assets were reported during 2020, which has reduced from 22 reported in 2019. Brief details of the hydrocarbon and chemical spills are provided in Table 2. Of the 16 spills 6 of these were chemical spills, but account for 93% of the total volume, as displayed in Figure 25.

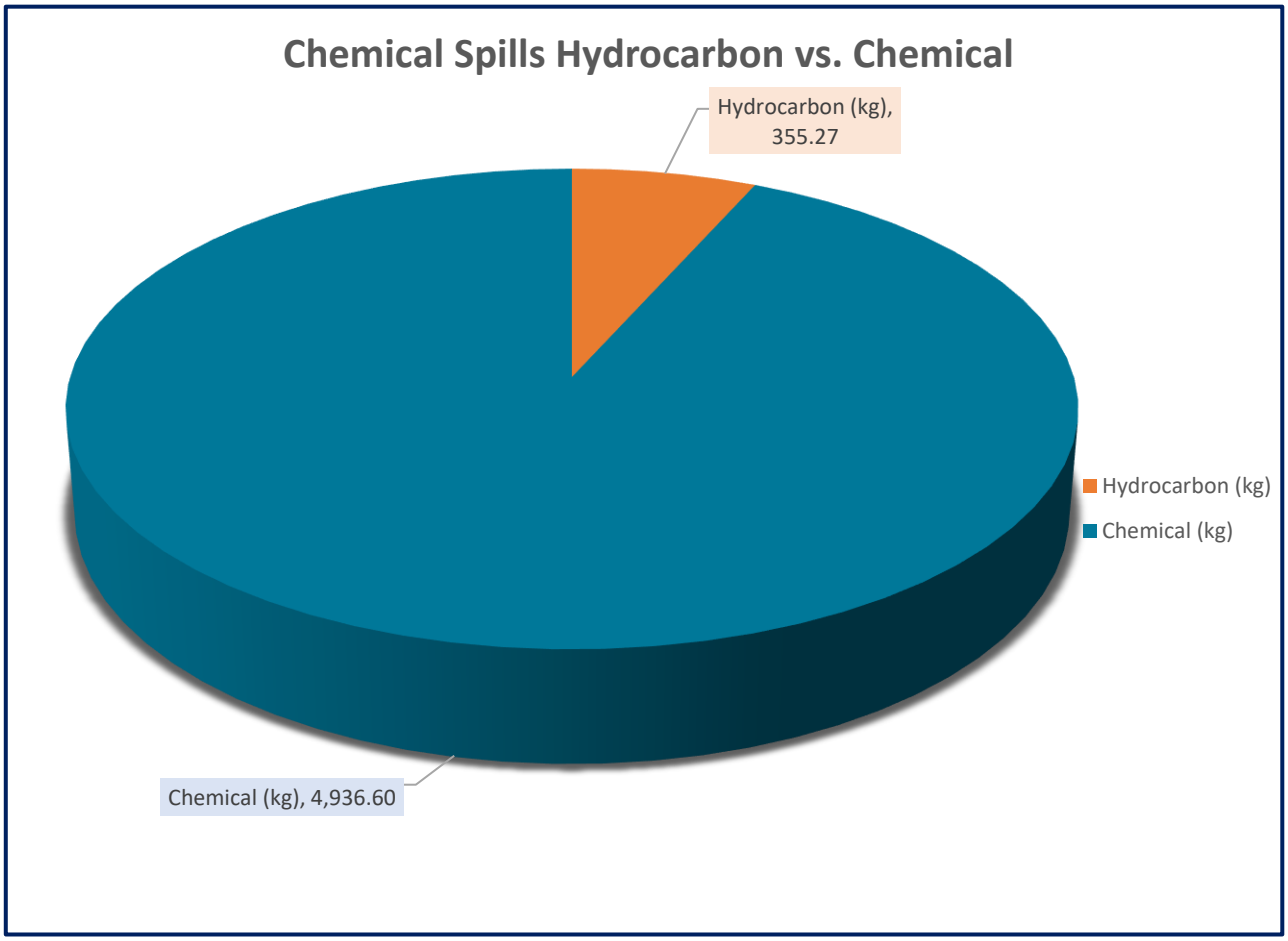


Figure. 24 Chemical Spills Hydrocarbon vs. Chemical (2020)

Table.2 Details of 2020 Hydrocarbon and Chemical Spills

Description	Hydrocarbon (kg)	Chemical (kg)
Leman		
Bund failure during breaking of containment. Following the incident the standard of bunding to be used was improved.	0.75	0
Unforeseen quantity in dead leg went to sea during removal during removal of corroded diesel line. The work was stopped when spill was identified and re-evaluated.	11.93	0
West Sole		
Loss of Hydraulic oil from a failed accumulator bladder on the hydraulic control system. The system was isolated.	100	0
Hydraulic oil released following a bursting disc failure of the control panel. The system was isolated.	100	0
Damaged fitting of hydraulic hose connection to production wing valve. The fitting was changed.	5	0
During refuelling and engine swap-over the incorrect valve alignment on standby diesel generator breather pipework allowed a leak path.	50	0
Cleeton		
Actuator stem seal failure on an upper master well valve causing a leak of Aqualink HT804F biodegradable hydraulic fluid. The well valve was isolated and repaired.	0	20
Damage to bunkering hose. Hose was isolated from the main diesel supply.	57	0
Failure of the internal seal an upper master well valve led to a hydraulic leak (Aqualink HT804F biodegradable hydraulic fluid). The well has been turned off and hydraulics isolated.	0	200
Leak from the subsea intensifier supplying hydraulic fluid (Aqualink HT804F biodegradable hydraulic fluid), investigation found cause to be split filter lid O ring, the filter was repaired.	0	3826
Failure of an internal seal inside the upper master valve caused a leak of hydraulic fluid (Aqualink HT804F biodegradable hydraulic fluid). The well was immediately shut in and isolated.	0	35

Produced water discharge from vent hose due to incorrect isolation during venting activities. The system was isolated, and hose capped.	1.29	0
Loss of hydraulic fluid (Aqualink HT804F biodegradable hydraulic fluid) due to an issue with the hydraulic supply line to subsea manifold. The line has been isolated.	0	850
Ravenspurn		
Lube oil heat exchanger failing internally.	28	0
Release of Corrtreat corrosion inhibitor due to perforation of the corrosion inhibitor supply line. Line was immediately isolated and depressurised.	0	5.3
TOTALS	**353.97**	**4,936.60**

PERFORMANCE AGAINST ENVIRONMENTAL OBJECTIVES

Annually PUK SNS set Environmental Objectives to drive environmental performance and improvements. In 2020, due to the COVID-19 pandemic, a decision was taken to focus on business continuity and security of supply. As such, the non-SHARP related Environmental Objectives were rolled forward into 2021.

Table.3 Environmental Objectives 2020

Business Objective	Overall Objective	Measure	Progress	Status
2020				
Extending the field life whilst Maximising Economic Recovery (MER) in line with the UK Net Zero Strategy	Delivery of the Southern Hub Asset Rationalisation Project (SHARP) project detailed define phase.	Completion of the detailed define phase and commitment to move into execute Q1 2021.	The define phase was completed with the Inde/ Leman fields moving into Free Flow. This reduced CO2 emissions in the field by XXX in2020, ahead of the new compression platform being installed in 2021 at 27B.	Completed
	Identification of behavioural and operational changes to drive efficiency/ limit emissions (CO_2 equivalent) on the Northern Hub manned platforms and terminals.	Moved to 2021.		
	Establish an understanding of sources of methane emissions (both in design and fugitive) on manned platforms and terminals.	Moved to 2021		

Table. 4 2021 Environmental Objectives and Targets

Business Objective	Overall Objective	Aspect	Measure
2021			
Extending the field life whilst Maximising Economic Recovery (MER) in line with the UK Net Zero Strategy	Completion of the Southern Hub Asset Rationalisation Project (SHARP) project.	Air Emissions	Completion of the installation of the BC compression platform and Inde/ Leman manned hubs to NUI status.
	Identification of behavioural and operational changes to drive efficiency/ limit emissions (CO_2 equivalent) on the Northern Hub manned platforms and terminals.	Air Emissions	Project identification to include in a hopper of potential projects; examples include Trent compressor.
	Establish an understanding of sources of methane emissions (both in design and fugitive) on manned platforms and terminals.	Air Emissions	NUI fugitive emissions calculation to be re-assessed; Action plan developed for the Northern Hub Assets; SHARP project fugitive emissions included in the environmental impact reduction process.