



CHRYSAOR



2019 Annual Public Statement of

Environmental Performance



CEO Foreword

As the UK's leading independent oil and gas group, Chrysaor's commitment to the environment is integral to our strategy. We are taking steps within our operations and wider business to reduce emissions and align to government targets of net carbon zero.

In 2019, Chrysaor acquired the ConocoPhillips UK business. This added significant opportunities and resources to the group, but it also meant we had two Environmental Management Systems (EMS) in place, which we are now integrating.

Just under half of Chrysaor's production today is natural gas. Not only is this the cleanest form of hydrocarbon to supply energy to the UK, but it is also much lower carbon intensity than LNG gas imports. This is crucial for the UK's energy transition to net zero.

Chrysaor's operated assets emit just under one million tonnes of carbon dioxide per year and we have been working hard to reduce our impact. Our aim is to achieve a 30 percent reduction in carbon emissions from our operated assets by 2025, with a further 20 percent by 2028. Long-term, our aim is to be net zero across our business.

To do this, we must approach the challenge in three ways. Firstly, we must produce our hydrocarbons in the most environmentally sustainable and efficient way we can. Secondly, we must invest in low or zero carbon energy supplies to power our assets. Thirdly, we will invest in hydrogen production together with removing and offsetting emissions with carbon capture and storage (CCS).

Chrysaor is proud to be leading the way as a founding partner of the Acorn CCS Project at St Fergus in the North East of Scotland, which includes the generation of hydrogen from methane. The UK Government and the European Union have part-funded this project, which can act as an exemplar for the UK and internationally.

I believe that lower carbon intensity UK produced hydrocarbons can go hand-in-hand with renewables and alternative sources of power. The UK oil and gas industry can continue to be vitally important for many decades supplying raw materials that currently have no easy substitute, power and transportable energy, together with employment and security.

At Chrysaor, we firmly believe that nothing is so urgent or important that we cannot take the time to do it safely, with care for the environment and in a way we can all be proud of. Chrysaor will continue to strengthen and integrate its organisation, set targets and seek opportunities in energy transition to achieve our net carbon zero ambition. Our journey, which will play out over the next decades, has just begun ...

Phil Kirk
Chief Executive Officer

Introduction

This report presents Chrysaor Exploration and Production Limited's environmental performance for 2019, as required by OSPAR Recommendation 2003/5.



About this report

The 2019 environmental report focuses on the performance of the Group's operated assets in the United Kingdom Continental Shelf (UKCS).

The report aims to:

- Describe our main assets and activities
- Provide a brief overview of the Group's environmental management
- Provide details on key environmental aspects and their impact
- Summarise our UK environmental performance and progress against objectives for the year

Chrysaor is the UK's leading North Sea independent oil and gas group and largest net producer. Our focus is to deliver safe, reliable operations to protect our people, assets and the environment and to generate value from within our portfolio.

Chrysaor operates five complexes in the Central North Sea (CNS), which are run as three business units or hubs; the Armada, Everest and Lomond fields (which are owned 100 percent) comprise one hub and following acquisition of the ConocoPhillips UK business on 30 September 2019, the J-Area and Greater Britannia Area. The Group also acquired assets in the East Irish Sea (EIS) and has assumed responsibility for completing a major decommissioning project on end-of-life assets in the UK Southern North Sea (SNS), which is expected to be materially complete by 2022.

Core Values

At Chrysaor, keeping our people and assets safe, and being good stewards of the environment are critical to running our business. At the heart of everything we do are four values. These represent what we stand for, what is important to us and what will not be compromised upon.



Integrity



Innovation



Passion



Safety

Business Principles

Our Core Values are supported by our Business Principles, which define our expectations in all key areas of our business activities.

- Risk Management and Environment
- Integrity and Ethics
- Economics
- Excellence
- Communication

Environmental Management

Chrysaor is committed to conducting its operations in such a way as not to cause harm to the environment. This is enacted by the Group's Health, Safety and Environmental Policy.



Environmental Management Systems

Chrysaor currently has two Environmental Management Systems (EMS) in place certified to ISO standard 14001:2015, having inherited ConocoPhillips UK's certification as part of the acquisition.

These systems are applied to manage the impacts of any activities, products and services on the environment. They provide a structured approach for continuous planning, implementing, reviewing and improving environmental protection measures, and working towards increasing environmental sustainability. An objective for 2020 is to integrate the two Environmental Management Systems into a single ISO 14001:2015 certification for the combined organisation.

Sustainability – Carbon and Energy Reduction Strategy

Chrysaor is committed to playing a leading role in the energy transition, while meeting the demand for reliable and safe energy.

The Group recognises that the oil and gas industry must collaborate to tackle the global energy challenge. Chrysaor has therefore partnered with several UK operators and service companies to support a new Net Zero Solutions Centre in Aberdeen.

The centre's objective is to accelerate the development and implementation of new technologies to decarbonise offshore operations. This is in support of the Industry's Roadmap, which aims to develop the UK Continental Shelf as the first net zero oil and gas basin globally by 2035.

In 2019, Chrysaor developed a carbon strategy for emission reduction and energy efficiency. This is in alignment with national and international commitments seen through the Kyoto Protocol, UK Carbon Budget, UK Climate Change Act and COP 21 (Paris Agreement). Central to this is the Scottish and UK Government long-term goals of being a net carbon zero economy by 2045 and 2050 respectively.

Chrysaor's Carbon and Energy Reduction Strategy has been designed to align with the internationally recognised Transition Pathway Initiative (TPI), the Task-Force on Climate-related Financial Disclosures (TCFD), Carbon Disclosure Project (CDP), EI Energy Essentials series, the Global Reporting Initiative (GRI) Standards, and the

ISO standard 16247-1:2012 on undertaking energy audits. These initiatives have been developed across multiple sectors and ensure consistency across industries.

This consistent approach will allow Chrysaor to be assessed and benchmarked against sector peers and other industries for preparedness in the energy transition with full transparency, and in a manner that is internationally recognised.

Our strategy consists of a framework and goals, supported by data analytics to understand current emissions and power usage. We have identified initiatives to reduce our carbon footprint by making changes and upgrades to existing plant and on new technologies to lower emissions further on our operated assets towards a net zero target.

Chrysaor is also a founding partner of the Acorn CCS Project, a carbon capture and storage project in the UK, based at St Fergus in the North East of Scotland. A joint venture pilot study between Chrysaor, Pale Blue Dot Energy and other major operators, the project's aim is to demonstrate that an economic, at scale solution can be developed within an appropriate regulatory framework. The scope has been extended to incorporate generation of hydrogen from methane. The Acorn CCS Project is part funded by the UK Government and the European Union and it is designated as a European Project of Common Interest (PCI).

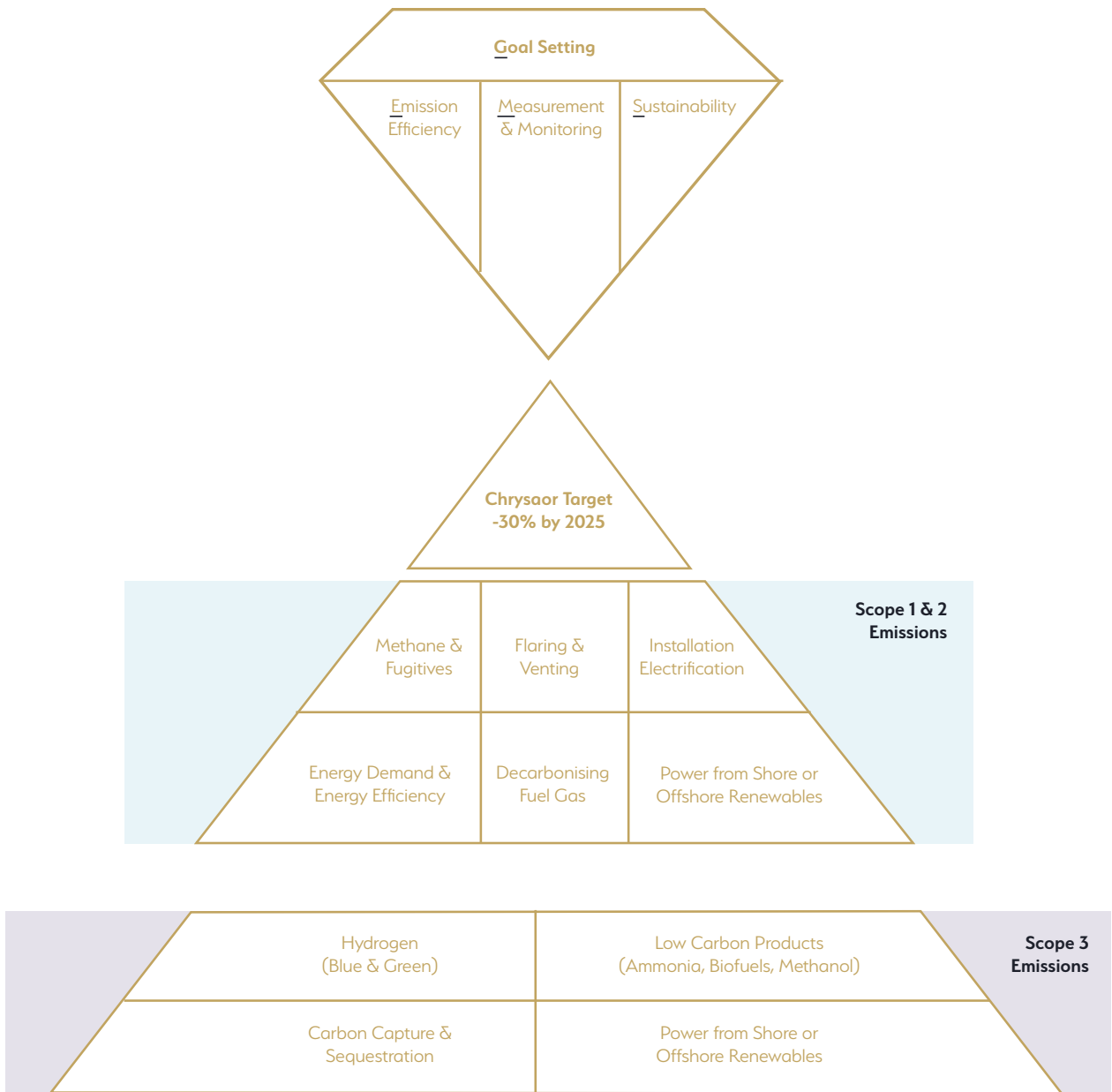


We routinely select and employ the best available technologies for our operations to ensure protection of our people and the environment. We have implemented proactive monitoring systems and processes across our assets, and we carry out extensive environmental baseline and impact assessments before and during our exploration activities."

Maurice Thomson,
Senior Vice President, HSEQ

Chrysaor Carbon and Energy Reduction Strategy

GEMS



HSE Policy

Chrysaor's HSE Policy supports our Core Values and Business Principles and focuses our Management Systems on robust risk management, incident prevention and cultural development issues associated with our operations.



Health, Safety & Environment Policy



Chrysaor will conduct its operations in such a way as not to harm people and minimise any impact on the environment. Chrysaor is fully committed to continuously improving its health, safety and environmental performance by the successful implementation of this Policy.

Chrysaor consents it will:

- Ensure compliance with all applicable legislation and standards;
- Ensure an effective management organisation is in place and all personnel and contractors are aware of their health, safety and environmental responsibilities;
- Create a safe and healthy working environment for our employees, contractors and all other persons who could be affected by its activities;
- Identify, evaluate and control the risks and impacts associated with its activities, including where the potential exists for major accident events;
- Ensure that energy and resource management are an integral part of the business;
- Promote resource and energy conservation, waste minimisation and pollution prevention;
- Recognise and respond to employee and community concerns regarding the health, safety and environmental aspects of the company's operations;
- Ensure all employees and contractors are competent to perform their health, safety and environmental roles; and
- Achieve continuous improvement of its business processes through the implementation of its Core Values and Business Principles.

Chrysaor will ensure that the necessary resources are provided to fully support this Policy and will ensure that it is subject to audit and review as part of the Management System goal of continuous improvement in performance.

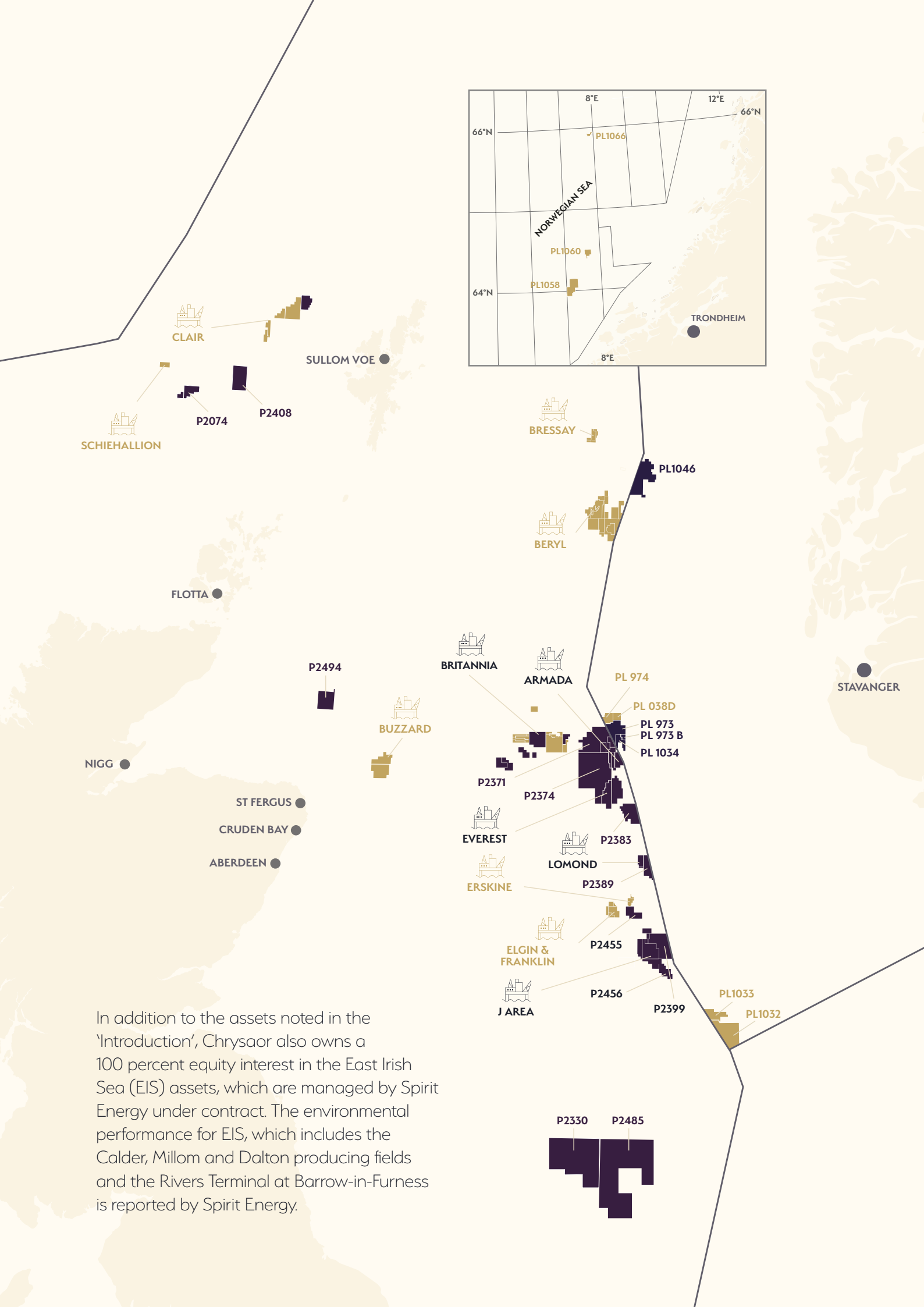
Phil Kirk
Chief Executive Officer

October 2019

UK Operations

Chrysaor's portfolio in the UK is well diversified and balanced in terms of oil, gas and condensate production, operated and non-operated assets and across several operators.





In addition to the assets noted in the 'Introduction', Chrysaor also owns a 100 percent equity interest in the East Irish Sea (EIS) assets, which are managed by Spirit Energy under contract. The environmental performance for EIS, which includes the Calder, Millom and Dalton producing fields and the Rivers Terminal at Barrow-in-Furness is reported by Spirit Energy.

In this document we provide the key environmental metrics for the three operated hub areas of Armada/ Everest/Lomond, J-Area and Greater Britannia Area, and Decommissioning.

Chrysaor is actively decommissioning its Southern North Sea (SNS) infrastructure comprising of 146 wells, 38 surface platforms (topside and jacket structures), subsea installations and all associated operated subsea pipelines together with the onshore Theddlethorpe Gas Terminal (TGT).

Chrysaor is also actively decommissioning the MacCulloch infrastructure comprising 13 subsea wells, four subsea manifolds, a Floating Production Storage Offtake (FPSO) mooring system and 22 pipelines.

	Asset	Interest
Armada/ Everest /Lomond (AEL)	Armada	100.0%
	Everest	100.0%
	Lomond	100.0%
J-Area	Jade	67.5%
	Jasmine	67.0%
	Joanne	67.0%
	Judy	67.0%
Greater Britannia Area (GBA)	Britannia	58.7%
	Brodgar	87.5%
	Callanish	83.5%
	Enochdhu	50.0%
Decommissioning	MacCulloch	40.0%
	Southern North Sea	Various
	Theddlethorpe Gas Terminal	50%

Chrysaor has non-operated equities in numerous other fields and infrastructures including:

	Asset	Interest
AEL	Erskine	32.0%
GBA	Alder	26.3%
Other	Beryl & Ness Area	19.7 – 49.1%
	Buzzard	21.7%
	Clair	7.5%
	Elgin/Franklin	14.1% - 14.7%
	Galleon	8.4%
	Nicol	18.0%
	Schiehallion	10.0%
Infrastructure	Brent Pipeline System	0.8%
	CATS Pipeline	0.7%
	ETS Pipeline	10.0%
	Sullom Voe Terminal	0.5%



Armada, Everest, Lomond

Armada

Location	224 kilometres east of Aberdeen
Block Number	Block 22/5b
Discovery Date	Oil and gas production began in 1997
Water Depth	89 metres
Tie Back	Rev and Gaupe, third-party fields in the Norwegian sector, and the Chrysaor operated Maria field in the UK sector are tie-backs to Armada
Infrastructure	A combined wellhead/production/living quarters platform, producing hydrocarbons from the Drake, Hawkins, Fleming, Rev, Seymour and Maria fields
Export	Condensate is exported via the Forties Pipeline System to the Kerse of Kinneil processing plant near Grangemouth; gas is exported via the CATS pipeline to Teesside



North Everest

Location	145 kilometres east of Scotland
Block Number	Block 22/10a
Discovery Date	Everest started production in 1993
Water Depth	90 metres
Tie Back	South Everest and East Everest wells are tied-back to North Everest
Infrastructure	North Everest is a combined wellhead/production/living quarters platform, bridge linked to the CATS riser platform. Hydrocarbon are produced from the North Everest, South Everest and East Everest fields
Export	Condensate is exported via the Forties Pipeline System to the Kerse of Kinneil processing plant near Grangemouth; gas is exported via the CATS pipeline to Teesside



Lomond

Location	268 kilometres east of Aberdeen
Block Number	Block 23/21a
Discovery Date	First production was achieved in 1993
Water Depth	83 metres
Tie Back	Erskine is tied-back via a multiphase pipeline to a dedicated production module on Chrysaor's Lomond platform on behalf of the operator
Infrastructure	A combined wellhead/production/living quarters platform producing hydrocarbons from the Lomond and Erskine fields
Export	Production is exported via infield pipelines to the CATS riser platform at North Everest; condensate is exported via the Forties Pipeline System to the Kerse of Kinneil processing plant near Grangemouth; gas is exported via the CATS pipeline to Teesside

J-Area



Judy/Joanne

Location	240 kilometres south-east of Aberdeen
Block Number	Block 30/7a
Discovery Date	Production began in 1997
Water Depth	75 metres (Judy); 79 metres (Joanne)
Tie Back	Joanne is a subsea manifold with six subsea wells tied back to Judy. Jade is a normally unmanned installation tied back to Judy. Jasmine is a wellhead platform tied back to Judy
Infrastructure	Judy provides full processing and conditioning of gas and condensate from Judy, Joanne, Jade and Jasmine
Export	Gas is processed on Judy then transported through the CATS pipeline; liquids are transported to Teesside through the Norpipe system



Jade

Location	240 kilometres south-east of Aberdeen
Block Number	Block 30/2c
Discovery Date	Jade came onstream in 2002
Water Depth	79 metres
Tie Back	N/A
Infrastructure	Jade is a high pressure/high temperature (HP/HT) development that consists of a normally unmanned platform tied back to Judy
Export	Gas and liquids are transported to Judy



Jasmine

Location	255 kilometres south-east of Aberdeen
Block Number	Block 30/6 and 30/7
Discovery Date	Jasmine came onstream in 2013
Water Depth	75 – 82 metres
Tie Back	N/A
Infrastructure	Jasmine is a 24-slot wellhead production platform (JWHP) with bridge-linked accommodation and utility platform
Export	Gas and liquids are transported to Judy



Greater Britannia Area

Britannia and Britannia Bridge Linked Platform (BLP)

Location	210 kilometres north-east of Aberdeen
Block Number	Block 16/26
Discovery Date	Commercial production began in 1998
Water Depth	136 metres
Tie Back	The Britannia satellites (Brodgar, Callanish and Enochdhu) are tied back to the BLP. Alder is a subsea well tied back to the BLP
Infrastructure	Britannia consists of a drilling, production and accommodation platform, a long-term compression module and a 90-metre bridge connected to the BLP production and utilities platform
Export	Condensate is delivered through the Forties Pipeline to the oil stabilisation and processing plant at Kerse of Kinneil, Grangemouth; natural gas is transported through a dedicated Britannia pipeline to the Scottish Area Gas Evacuation (SAGE) facility at St Fergus

Alder

Location	27 kilometres west of Britannia
Block Number	Block 15/29a
Discovery Date	First production was achieved in 2016
Tie Back	N/A
Infrastructure	Alder is a single subsea well tied-back and remotely controlled from Britannia by Chrysaor on behalf of the operator

Britannia Satellites

Brodgar	Located in Block 21/3a, lies approximately 41 kilometres west of Britannia. Production began in 2008
Callanish	Located in Block 15/29b and 21/4a, lies approximately 25 kilometres from Britannia and comprises two accumulations. Production began in 2008
Enochdhu	Located in Block 21/5a, a single well subsea tie-in to the Callanish manifold. Production began in 2015
Infrastructure	Brodgar, Callanish and Enochdhu subsea developments are controlled from Britannia
Export	Fluids are separated on the Britannia BLP

East Irish Sea

Chrysaor owns a 100 percent equity interest in the East Irish Sea (EIS) assets, which are managed by Spirit Energy under contract. EIS comprises the producing fields of Calder, Millom and Dalton and the Rivers Terminal at Barrow-in-Furness.

Calder

Location	East Irish Sea
Block Number	Block 110/7a
Infrastructure	Calder consists of an unmanned platform and three development wells
Export	Gas is fed to a producing platform then through a dedicated 49-kilometre pipeline to the Rivers Terminal at Barrow-in-Furness

Millom and Dalton

Location	East Irish Sea
Block Number	Block 110/2c, 113/26a and 113/27a (Millom); 110/2b (Dalton)
Infrastructure	Millom is an unmanned wellhead platform and subsea template; Dalton is a subsea template. Millom and Dalton are controlled from the North Morecambe Terminal
Export	Sweet natural gas from Millom and Dalton is fed through to the third-party North Morecambe Terminal via the North Morecambe platform



Rivers Terminal

The Rivers Terminal processes the sour gas from Calder, providing compression and removing hydrogen sulphide before piping the sweetened gas to the third-party North Morecambe Terminal for further processing, including nitrogen removal.

Decommissioning

Southern North Sea

In 2019, Chrysaor continued to progress with Southern North Sea (SNS) decommissioning activities at Viking, LOGGS and Murdoch. Pipeline flushing and cleaning started in 2015 and it was completed for all operated and third-party pipelines in 2019. Plugging and abandonment of the 146 wells in the SNS began in 2014 and this work continues.

Chrysaor assumed responsibility for this major decommissioning project on end-of-life assets following acquisition of the ConocoPhillips UK business on 30 September 2019.

Final clean and disconnect work scopes were developed to reduce the need to re-board the installations until the platform removal phase. These work scopes comprise removal of bulk hydrocarbons, purging the platform topsides and flushing and cleaning the infield and export pipelines to a state termed 'cold suspension'. This is where there are no hydrocarbons present and the facility is ready for removal from the field.

At the end of 2019, a total of nine platforms had been removed in the SNS, with a further 17 in cold suspension awaiting removal. Full details of current decommissioning progress across the SNS installations is presented overleaf.

Chrysaor is proactively addressing the challenges of decommissioning infrastructure in the SNS. Much of this is situated within two overlapping designated offshore Marine Protected Areas (MPAs) - the North Norfolk Sandbanks and Saturn Reef Special Area of Conservation (SAC) and the Southern North Sea SAC.



The Bokalift 1 working in the Southern North Sea

Our focus is to promote opportunities to reduce the environmental impact of our decommissioning activities, while responsibly fulfilling decommissioning scopes in accordance with OSPAR. To date, our preferred option for decommissioning the infield pipelines is to flush them to remove any hydrocarbon residues and then to leave them *in situ* with minimum intervention. To minimise potential hazards to other users of the sea, the cut pipeline ends will be buried within the seabed where feasible, or they will have rock placed over them. Chrysaor's active Decommissioning Programmes can be accessed on www.chrysaor.com.

In support of our approach to leave the infield pipelines in place, a post decommissioning monitoring programme has been developed to inspect the pipelines to identify emerging risks to other users of the sea and future remediation requirements.

Southern North Sea



Viking Area

Location	Southern North Sea
Cessation of Production	Production ceased in early 2016
Removed Infrastructure	Eight platforms were removed in 2019 – Viking CD, DD, ED, GD, HD, KD, LD and Victor JD
Remaining Infrastructure	Viking AR and the Viking Transportation System (VTS) Complex (BA, BC, CP and BD) are in cold suspension awaiting removal in 2020. Victor JM is awaiting plug and abandonment



LOGGS Area

Location	Southern North Sea
Cessation of Production	Production ceased in August 2018
Removed Infrastructure	Vulcan UR was removed in 2019
Remaining Infrastructure	LOGGS Complex (PR, PC, PP and PA) LOGGS satellite platforms (North Valiant PD, Vampire OD, Viscount VO, Europa EZ, Ganymede ZD, North Valiant SP and Vanguard QD) are in cold suspension awaiting removal Remaining satellite platforms (South Valiant TD, Vulcan RD, Mimas MN, Saturn ND and Tethys TN) are in warm suspension Callisto ZM and NW Bell ZX have still to be plugged and abandoned



CMS Area

Location	Southern North Sea
Cessation of Production	Production ceased in August 2018
Removed Infrastructure	N/A
Remaining Infrastructure	Caister CM satellite platform is in cold suspension awaiting full removal in 2020 Murdoch MD, MC, MA and the four normally unmanned satellite installations – Boulton BM, Munro MH, Kelvin TM and Katy KT, are in warm suspension Murdoch complex is expected to achieve cold suspension in 2020, the remaining platforms are awaiting well plug and abandonment



Southern North Sea (continued)

Theddlethorpe Gas Terminal (TGT)

TGT was withdrawn from under the Control of Major Accident Hazards (COMAH) safety regime at the end of September 2019. In parallel, vendors were selected and contracted for the site's Phase 1 demolition. This will take the terminal's processing plant and facilities back to concrete slab level. For Phase 1 demolition, Chrysaor retains accountability for the site's environmental licences and consents. Phase 2 demolition will return the site to Grade 2 arable land.

Location	Lincolnshire
Cessation of Production	Production ceased in August 2018
Removed Infrastructure	Flushing, cleaning and removal of hazardous materials from the site was completed in 2019
Remaining Infrastructure	Demolition activities start in 2020, with a planned 18-month duration

Central North Sea

MacCulloch

The MacCulloch wells were tied back via two subsea drilling centres to a floating production, storage and offloading (FPSO) vessel, which was removed from the field in the first phase of decommissioning in 2015. The well intervention and suspension work scopes completed in 2017 assured two verified barriers were in place in all the subsea wells, optimising the work scope for the future full well abandonment programme.

Location	Central North Sea – Block 15/24b
Cessation of Production	Production ceased in 2015
Removed Infrastructure	Well intervention and suspension work scope completed in 2017. Three wells were abandoned in 2019
Remaining Infrastructure	Remaining wells are due to be fully abandoned in 2020. Remaining subsea infrastructure will be fully removed in accordance with the MacCulloch Decommissioning Programme

Well Operations

Valaris 92

In 2019, the *Valaris 92* drilling rig successfully continued with the planned Southern North Sea (SNS) abandonment campaign. It carried out 16 well abandonments across three platforms (North Valiant SP, Vanguard QD and has begun work at Murdoch MD), and one subsea location (McAdam MM). This brings the total wells abandoned to 99 out of 146 overall in the SNS.

Valaris 120

The *Valaris 120* remained at the Jasmine Wellhead Platform throughout 2019. The first well drilled was S13, a horizontal production well targeting the Palaeocene sand in the Joanne North area of J-Area. This was followed by a rig move from the South to the North side of the platform. The first well drilled by the rig on the north side was the S15 Merida high pressure/high temperature (HP/HT) exploration well, targeting the Triassic Josephine sandstone. This well was successfully completed and brought into production in 4Q 2019. Drilling on S14, another horizontal well targeting the Palaeocene sand, started in late 2019. This well will be completed in early 2020.



Valaris JU-249 at Armada

Valaris JU-249

The *Valaris JU-249* remained in the Greater Armada Area, drilling the Maria Terrace well (completed in 1Q 2019) and the Mabel appraisal well in Block 16/29e, 20 kilometres from Armada (completed in 2Q 2019). It also carried out batch drilling on the Hawkins and Seymour Horst wells – two new development wells – at the Armada platform. The *Blue Orca* vessel was brought in to support the drilling operations, with clean-up taking place on Armada.

The Maria Terrace well, which was brought on-stream in February 2019, is the second Maria well following the Crestal well drilled in 2018. The Mabel well confirmed the presence of hydrocarbons and is currently suspended pending technical reviews. The Hawkins well came on stream in December 2019 and the Seymour Horst well is planned to come on stream in 2020.

Transocean 712

The *Transocean 712* initially drilled, completed and successfully tested the Brodgar H4 subsea development well in the first half of 2019. This well has subsequently been tied-in and is producing successfully via the host Britannia installation. First gas was achieved in October 2019.

The rig then transitioned into plug and abandonment (P&A) mode to carry out a multi (13) well subsea abandonment campaign in the MacCulloch field. This campaign began successfully by using an innovative perforation/wash/cement abandonment technique, which minimises risk and rig-time. By the end of 2019, three MacCulloch wells were successfully abandoned.

2019 Objectives

Chrysaor outlined several environmental focus and improvement areas in their 2019 Health, Safety, Environment and Quality (HSEQ) Plan.



Company wide, the Group successfully completed the following objectives:



Energy Management Strategy

This is now integrated into Chrysaor’s Carbon and Energy Reduction Strategy. It was developed with Chrysaor’s technical, operations and HSEQ teams and uses international standards, industry-leading technical advice, OEM technical advisers and the operational knowledge within the business. It is the beginning of Chrysaor’s carbon and energy reduction journey.



Energy Savings Opportunity Scheme (ESOS) Phase II

Compliance was underpinned by the Chrysaor Carbon and Energy Reduction Strategy and the work was completed in the emissions reduction feasibility studies. The evidence pack was assessed by a registered ESOS lead assessor and it was deemed to meet the requirements.

This allowed senior management sign-off and for notification to be made to the Environment Agency by a set deadline date.



Produced Water Improvement Project

These process improvements on Lomond are progressing and include optimisation of the start-up of the Erskine wells and hydrocyclone performance. Statistical analysis was carried out for chemical optimisation, which resulted in the deployment of new demulsifiers, de-oilers and re-assessment of chemical dose rates in 2019. A water polishing skid was procured and this will be installed on the Lomond platform’s Erskine module in 2020.



Emissions Reduction Feasibility Studies

Investigated as part of the Chrysaor Carbon and Energy Strategy development. The opportunities identified have been handed over to the relevant departments for progressing through 2020 and onwards.



Stack Sampling

Successfully completed on Armada and reported to OPRED as being ‘completed within the Regulatory timeline’.



Diesel Ring-Main Replacement Work

Started in 2019 and consists of replacing defective pipework on Lomond. This is 90 percent complete. The installation of new pipework in the diesel recirculation system is yet to begin.



The ConocoPhillips UK business, which Chrysaor acquired in 2019, had outlined several strategic environmental goals and improvement areas. These were included in their UK HSE Plan:



ISO 14001 Environmental Management System (EMS) Recertification.

Successfully achieved the ISO 14001:2015 standard with zero findings. This demonstrated the suitability and effectiveness of the EMS.



Permit Consolidation and Surrender

Managed in line with the Southern North Sea decommissioning programme and reducing requirements for operational permits, licences and consents. EU ETS permits were promptly surrendered for the Murdoch and LOGGS complexes and the onshore Theddlethorpe Gas Terminal (TGT) following cessation of production.



Continue to Execute the Southern North Sea (SNS) Decommissioning Programme

Safely removed nine offshore platforms in the SNS. Submitted and received Secretary of State approval for the Decommissioning Programme associated with the Caister CM platform (CDP1) to allow for removal in 2020 and for the MacCulloch Decommissioning Programme (MDP1). This will allow for removal of the remaining infrastructure post successful well plug and abandonment.



Standardisation of Environmental Performance Monitoring and Data Management

Achieved across the assets including the introduction of EmTRAX for chemical management across Well Operations to deliver efficiencies in data handling and accuracy.



Energy Savings Opportunity Scheme (ESOS) Phase II

Compliance was efficiently achieved through the in-house appointed ESOS registered lead assessor. This allowed senior management sign-off and notification to be made to the Environment Agency within the set deadline.

2019 Performance

Environmental performance
achieved across the operated
portfolio in 2019.



Atmospheric Emissions

The main source of atmospheric emissions from Chrysaor’s operations are from the combustion of fuels (gas and diesel) for electrical power generation, compression of gas, and export of oil to shore.

A small quantity of reservoir gas provides the primary fuel source and diesel is used as a back-up. Flaring and venting emissions are associated with routine maintenance activities, equipment and plant trips plus shutdown and start-up activities. Flaring and venting is restricted to the minimum required for the safe operation of the installation.

Atmospheric emissions from well operations are mainly associated with running diesel-driven engines for the rigs’ power generation. Flaring is also used to remove hydrocarbons produced during well testing and clean-up operations.

Atmospheric pollution affects local air quality. It is also linked to global warming, ozone depletion and acid deposition in soil and water.

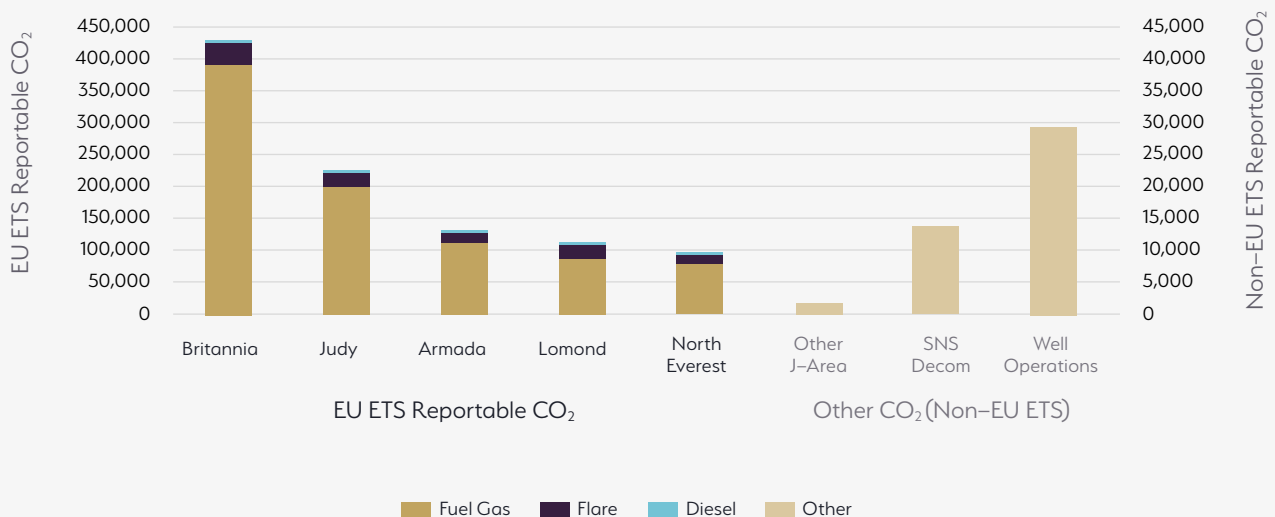
Greenhouse Gas Emissions

The primary greenhouse gases (GHGs) in the Earth’s atmosphere are water vapour, carbon dioxide (CO₂), methane (CH₄), nitrous oxide (N₂O), and ozone.

The emission of Carbon Dioxide (CO₂) is governed by the European Union Greenhouse Gas Emissions Trading System (EU ETS), which is currently in the third phase, running from 2013 to 2020. As part of EU ETS, qualifying offshore installations hold GHG emissions permits, which authorises them to emit CO₂ from the combustion of fuels. In 2019, Chrysaor’s qualifying operated assets (Armada, Lomond, North Everest, Judy and Britannia) emitted 960,000 tonnes of CO₂.

Atmospheric emissions from Jade, Jasmine, decommissioning and rig-based activities are not reportable under EU ETS, but they are included in the Chrysaor Group’s environmental metrics reporting and are presented here as Other CO₂ (non-EU ETS). Rig-based activities include emissions from the *Valaris JU-249* drilling in the Armada area, the *Valaris 120* operating in the J-Area, the *Transocean 712* completing the Brodgar H4 subsea development well before starting well plug and abandonment operations at MacCulloch and the *Valaris 92* undertaking Southern North Sea plug and abandonment.

CO₂ Emissions from Chrysaor’s Operations, 2019



Other Atmospheric Emissions

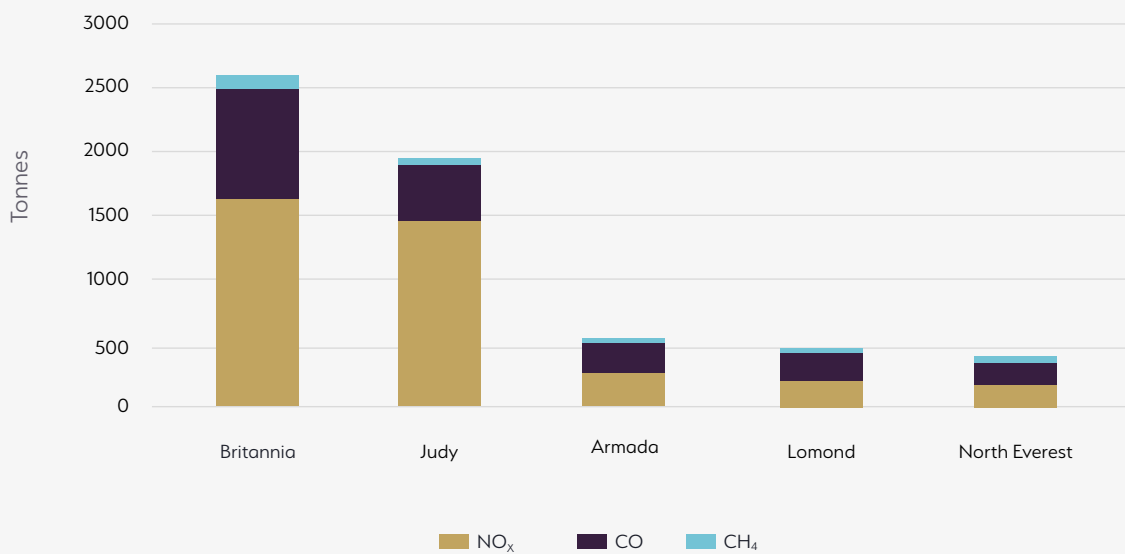
The Offshore Combustion Installations (Pollution Prevention and Control) Regulations 2013 (PPC) regulate atmospheric emissions (except for CO₂) from offshore oil and gas facilities. Armada, Lomond, North Everest, Judy and Britannia hold PPC permits, with specific limit values for Methane (CH₄), Sulphur Oxides (SO_x), Nitrous Oxides (NO_x), Carbon Monoxide (CO) and non-methane volatile organic compounds (NMVOC).

The quantity of gases emitted to air are calculated based on fuel gas and diesel composition data on each installation and industry-agreed emissions factors.



The emissions generated from the combustion of fuels reported in 2019 were within the maximum permitted limits for each asset.

NO_x, CO and CH₄ Emissions from Pollution Prevention and Control Reportable Installations, 2019



Discharges to Sea

Oil Discharges

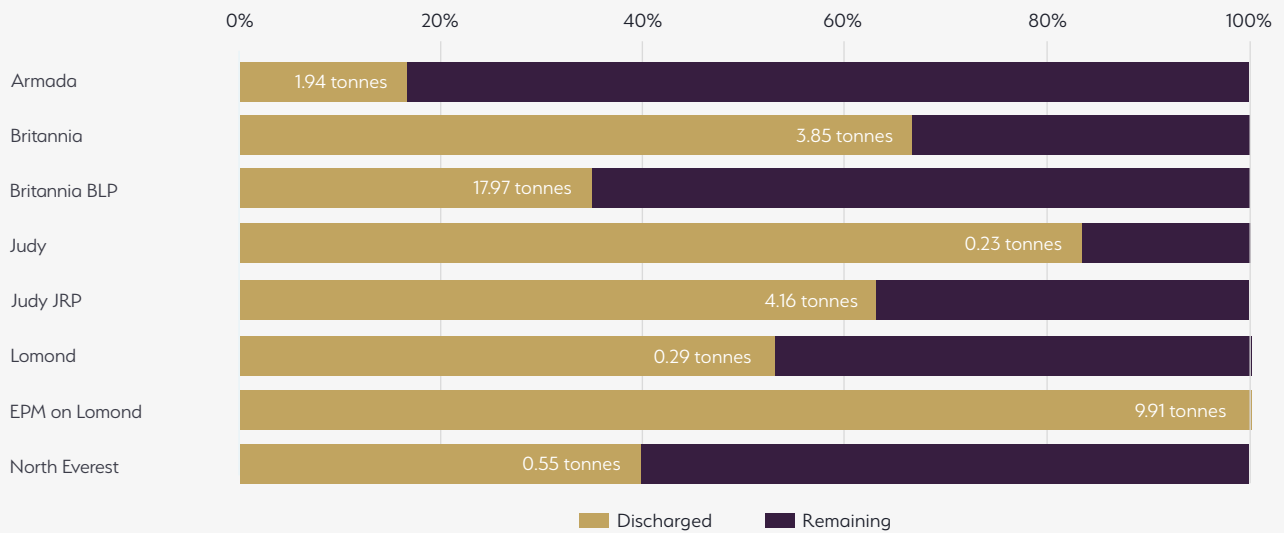
The OSPAR Commission recommendations are regulated through the Offshore Petroleum Activities (Oil Pollution Prevention and Control) Regulations 2005 (as amended) (OPPC).

Water produced alongside oil and gas operations, known as produced water, contains dispersed oil which is treated to permitted levels before being discharged to the marine environment. Produced water is one of the largest sources of hydrocarbon discharges to the sea from the offshore oil and gas industry. Chrysaor installations produce only a small percentage of the total produced water generated by the industry. While there are treatment systems in place

offshore to separate oil from the produced water, the discharge still has some residual oil content.

The Armada and North Everest platforms have single discharge points of produced water, while Lomond (and Erskine), Judy (and the Judy Riser Platform) and Britannia (and the Britannia Bridge-Linked Platform) have two permitted discharge points. The quantity of oil discharged to sea under permitted conditions for 2019 is illustrated for all installations in relation to the total permitted quantity. The quantity of oil discharged is dependent upon the volume of produced water discharged and its associated concentration.

Oil Pollution Prevention and Control Permit Compliance, 2019



Regulatory Reportable Oil in Water Events, 2019

	>100mg/l				Other OPPC**				PDN			
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
Armada	2	1	0	2	1	1	0	1	0	0	0	1
Lomond	10	12	4	4	4	5	3	3	1	0	0	0
North Everest	0	0	0	0	0	0	0	0	0	0	0	0
Britannia	1*	2*	2*	2	0*	0*	0*	0	0*	0*	0*	0
Judy	0*	1*	0*	2	0*	0*	1*	1	0*	1*	0*	0

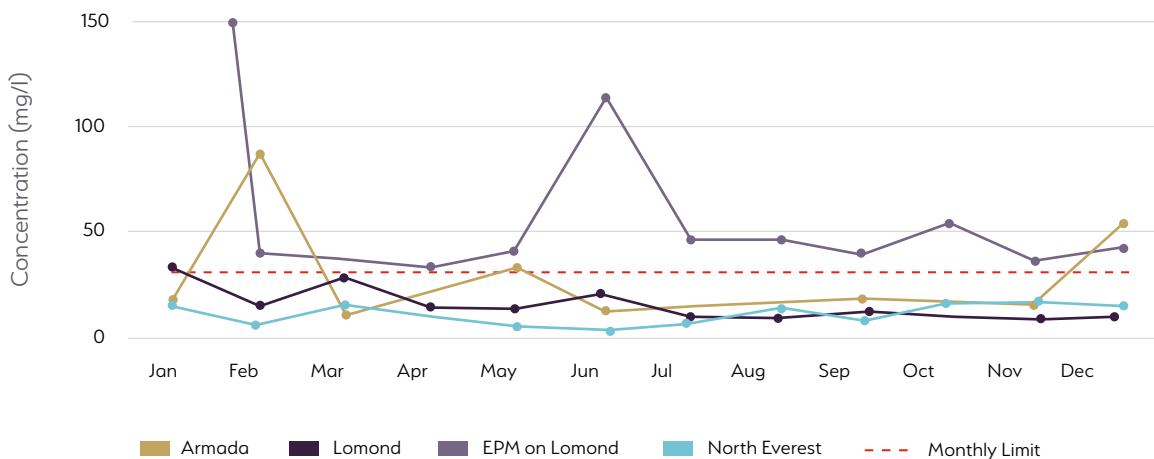
* First three quarters of 2019 were under ConocoPhillips operatorship.

** Other OPPC includes: >30mg/l, meter failure, annual permit exceedance and missed samples.

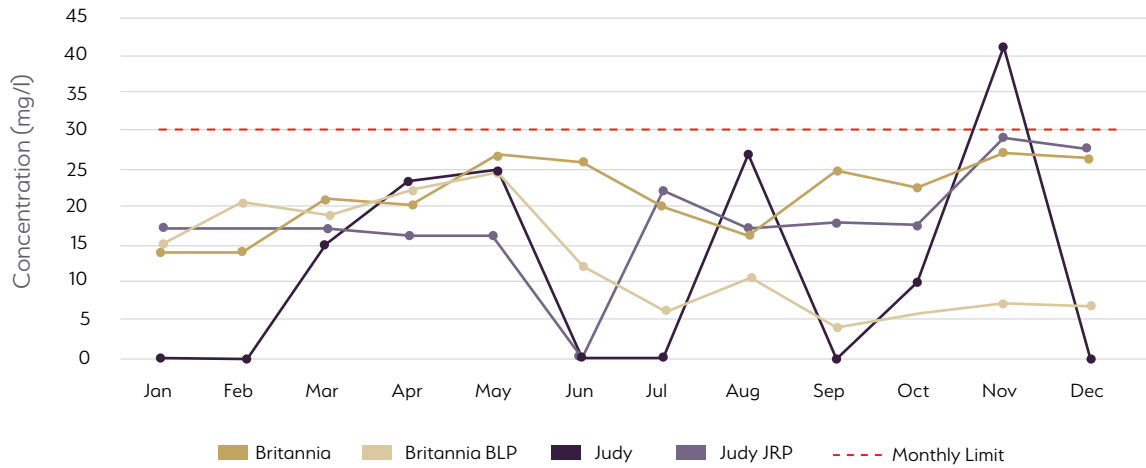
In 2019, 53 produced water discharge OPPC non-compliance events occurred on the Armada, Lomond and North Everest installations. Of these, 16 events were with respect to the OPPC maximum monthly average concentration of oil per litre of water (mg/l) exceeding 30 mg/l; 35 events were with respect to the concentration of individual oil in produced water samples exceeding the 100mg/l OPPC permit limit; one was a meter failure; and, one event was the result of the annual tonnage of oil in produced water being exceeded.

In addition, two Permitted Discharge Notifications (PDNs) also occurred – one at Lomond and one at Armada. The Lomond PDN took place in January as a result of batch discharging during the Erskine start-up, resulting in the oil in water discharge limit on one tonne in 12-hours being exceeded (5.9 tonnes reported). The Armada PDN occurred in November when the Rev field was being brought online, resulting in a sheen extending to the 500-metre zone. The Rev wells had been offline for more than a year.

Monthly Oil in Water Performance for Armada, Lomond and North Everest Installations, 2019



Monthly Oil in Water Performance for the Britannia and Judy Installations, 2019



* Note: Britannia and Judy were operated by ConocoPhillips UK until 30 September 2019.

In 2019, a further 12 produced water discharge OPPC non-compliance events occurred on the Britannia and Judy installations. Of these, one event was with respect to the OPPC maximum monthly average concentration exceeding 30 mg/l; 10 were with respect to the concentration of oil in produced water discharge exceeding the 100 mg/l OPPC permit limit; and, one event was in relation to a missed sample. In addition, one PDN was also reported at the Judy installation for a sheen extending to the 500 metre zone.

Short-duration (term) OPPC permits were in place to support pipeline flushing and cleaning operations for decommissioning operations in the Southern North Sea. All former production pipelines were cleaned to a concentration of below 30 mg/l hydrocarbons in pipeline flush fluids. In addition, term OPPC permits were in place to support clean-up operations post drilling activities.

Chemical Discharges

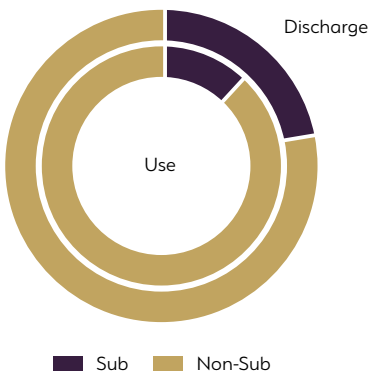
Chemical use for offshore production operations is regulated under the Offshore Chemical Regulations 2002 (as amended). A key objective of these regulations is to minimise discharges to the marine environment, to identify chemicals that might be considered hazardous and to ensure wherever possible their substitution by less hazardous or non-hazardous chemicals.

A substitution warning is assigned to a chemical if a component appears on the OSPAR prescribed list for priority action, or if the component fails to meet set criteria with respect to persistence, bioaccumulation potential or toxicity.

Each platform holds a separate chemical permit, which includes justification for the use of chemicals that hold a substitution warning. The use (kg) of substitution versus non-substitution chemicals has been presented, with the percentage contribution to total use also provided.

Chrysaor carry out frequent reviews of chemical requirements with our chemicals suppliers and strive to reduce the number of chemicals that are flagged for substitution.

Annual Chemical Use and Discharge from Chrysaor-Operated Production Installations, 2019

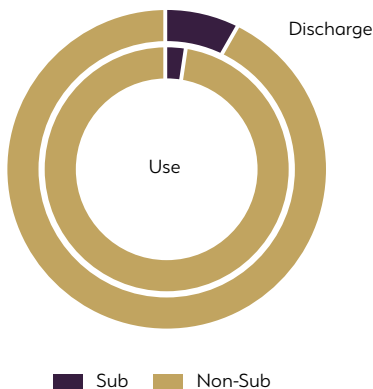


	Non-Sub	Sub/Product Warning
Use (kg)	1,453,897	194,332
Discharge (kg)	1,540,391	435,889

In 2019, the Chrysaor-operated platforms display lower usage figures than discharge figures. This is as a result of discharges at the Armada platform, where chemicals used as part of the Hawkins drilling campaign were discharged and reported on the production chemical permit (usage captured on the drilling chemical permit).

Short-duration chemical permits were also in place in 2019 to support drilling activities, pipeline operations and SNS decommissioning activities. Drilling activities represent the largest chemical use and discharge, comprising drilling mud, cement, completion and additive chemicals.

Annual Chemical Use and Discharge from Chrysaor’s Drilling Activities, 2019

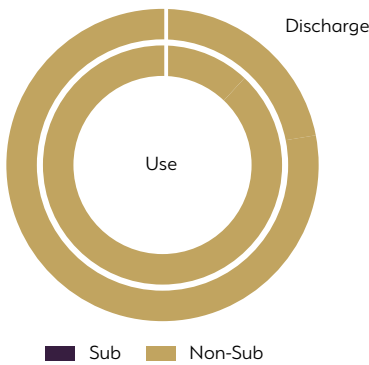


	Non-Sub	Sub/Product Warning
Use (kg)	27,256,681	784,542
Discharge (kg)	4,087,899	350,436

Drilling activities included operations from the *Valaris JU-249*, the *Valaris 120* and the *Transocean 712*. Operations for the *Valaris 92* are included within the decommissioning activities. In 2019, the *Valaris JU-249* completed the Mabel and Hawkins wells in the Greater Armada Area; the *Valaris 120* completed three wells in the J-Area; the *Transocean 712* completed the Brodgar well in the Greater Britannia Area.

Chemical use and discharge in 2019 covered by pipeline chemical permits included five pipeline campaigns across the Greater Armada Area, Greater Britannia Area and J-Area.

Annual Chemical Use and Discharge from Chrysaor’s Pipeline Activities, 2019

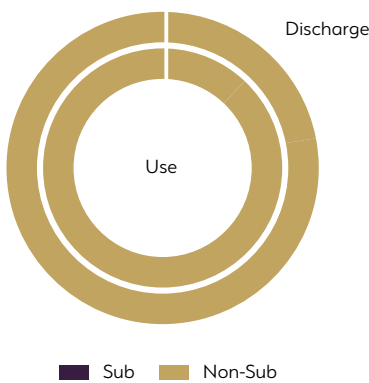


	Non-Sub	Sub/Product Warning
Use (kg)	303,487	0
Discharge (kg)	349,898	0

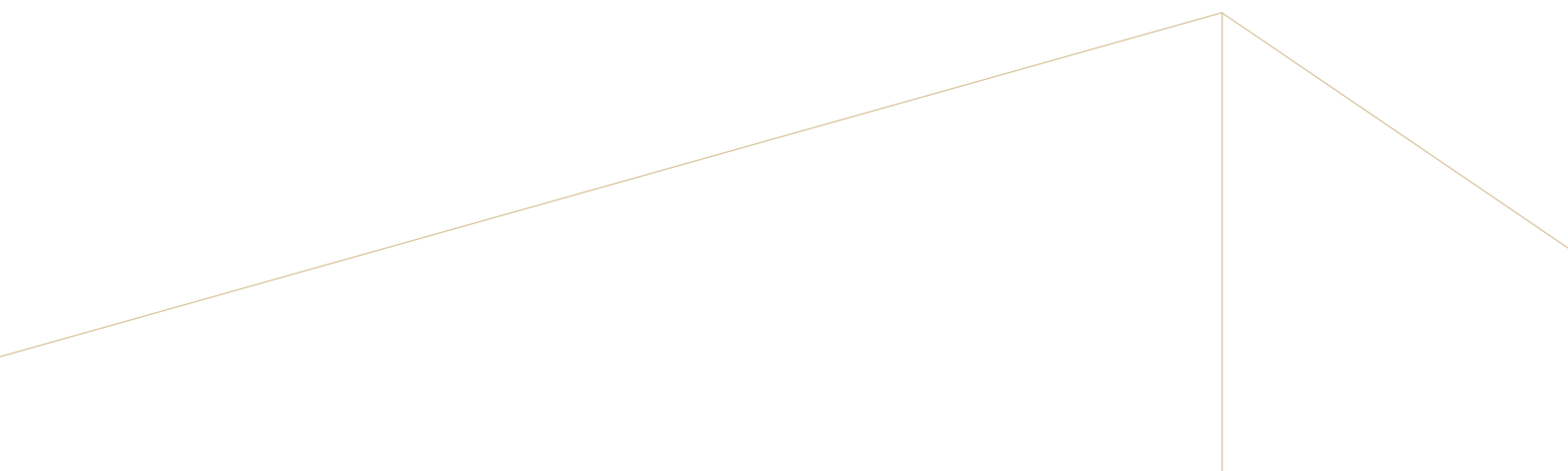
Chemicals used for pipeline flushing, rig-based plug and abandonment and accommodation work vessels associated with Southern North Sea decommissioning are presented under the chart for Decommissioning. The pipeline flushing programmes typically use cleaning chemicals and ethylene

glycol and methanol diluted in sea water. Discharge to the sea during pipeline cleaning operations were minimised by using downhole reinjection or containment for onshore treatment and disposal wherever practicable.

Annual Chemical Use and Discharge from Chrysaor’s Decommissioning Activities, 2019



	Non-Sub	Sub/Product Warning
Use (kg)	2,596,280	13,919
Discharge (kg)	919,711	729



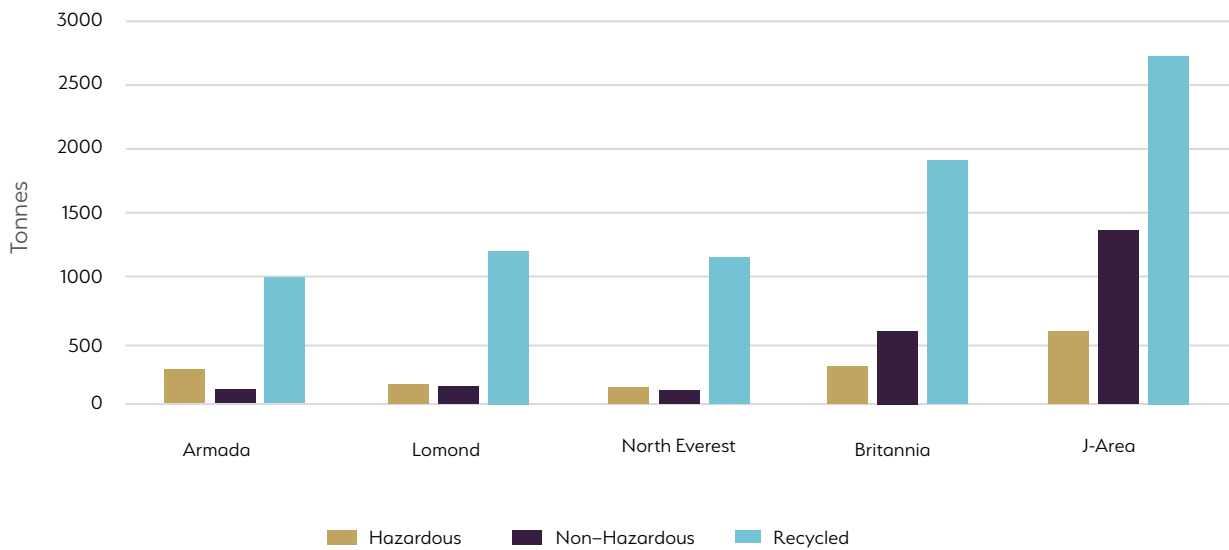
Waste

Waste is categorised as hazardous or non-hazardous, dependant on whether the waste has one or more of the 15 hazardous constituents specified in Annex III of the EU revised Waste Framework Directive (WFD, European Directive 2008/98/EC). Directive waste is divided into three main categories: recycled, non-hazardous and hazardous waste.

metal and wood. Examples of hazardous waste include bulk liquid wastes from mobile accommodation or drilling units on hire, process sludges, oily rags, used chemicals, paint, batteries, fluorescent light tubes and electrical and electronic equipment.

Chrysaor works with contract waste management companies to reduce waste, and to recycle and reuse items wherever possible. Non-hazardous waste types include packaging, galley and accommodation wastes, scrap

Waste Disposal from Chrysaor’s Installations, 2019

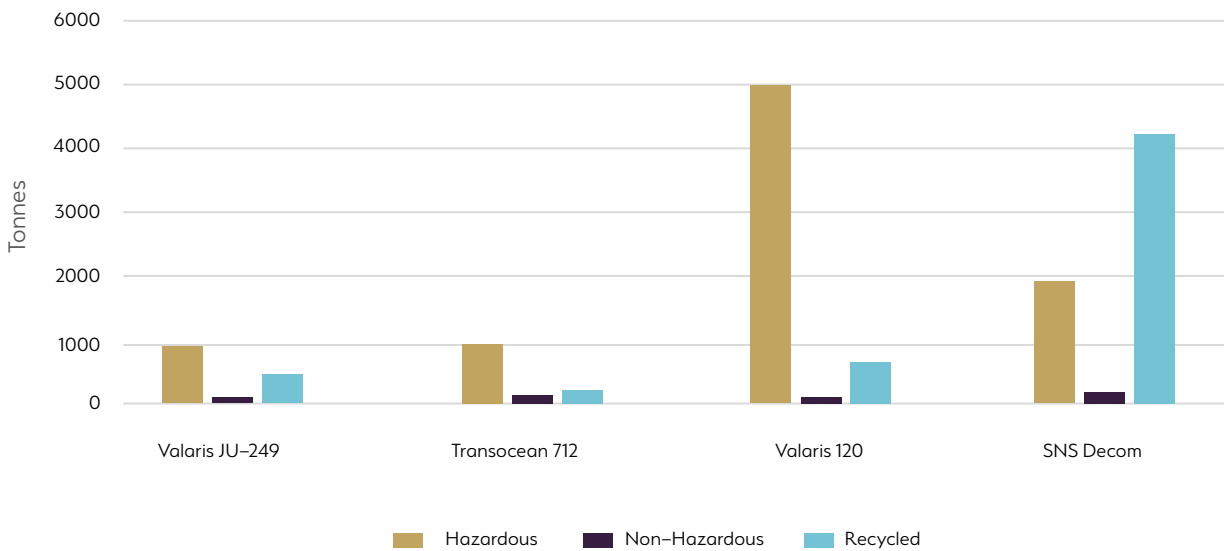


Note: J-Areas waste includes the Judy, Jasmine and Jade platforms.

Waste attributed to decommissioning is that generated whilst preparing for offshore asset removal, dismantling of platforms and infrastructure and pipeline flushing and disconnect and includes wastes from the *Valaris 92*.

Waste generated from well operations includes the domestic and operational wastes from the *Valaris JU-249*, the *Valaris 120* and the *Transocean 712*. The largest quantity of hazardous waste produced during 2019 is attributed to Well Operations contaminated drill cuttings associated with this work.

Waste Disposal from Drilling Rigs Contacted by Chrysaor, 2019



Note: Southern North Sea Decommissioning waste includes waste from the assets and the *Valaris 92*.

In 2019, the *Valaris JU-249* utilised a 'TWMA Rotomill' cutting treatment unit, which used a heat treatment technique to process drill cuttings at source. This discharges dry powder and water to the marine environment with oil-based muds either being reused during subsequent drilling operations or returned to shore. This reduced the quantity of contaminated cuttings sent onshore for treatment and disposal. On the Hawkins well, 1,688 metric tonnes of drill

cuttings were processed offshore removing the requirement for 352 skips of cuttings to be sent onshore for treatment and disposal. In addition, 1,732 bbls of recovered oil-based mud (OBM) was reused in the active OBM system offshore. On the Seymour Horst well (drilling completed in 2019 but other well activities still ongoing), 1,461 metric tonnes of drill cuttings were processed offshore, removing the requirement for 305 skips and allowing reuse of 1,417 bbls of OBM.

Spills to Sea

Non-permitted releases of oil or chemicals to the sea are reported to the Offshore Petroleum Regulator for Environment and Decommissioning (OPRED) using a Petroleum Operations Notice 1 (PON1). This provides details of the event and actions taken to prevent reoccurrence. All spills to sea are reported and investigated, regardless of size.

Chrysaor's Armada, Lomond and North Everest installations had 12 unplanned oil releases to the sea in 2019 (including rig activity in the Greater Armada Area), a reduction from the 19 reported in 2018. Of these, none were greater than one tonne.

The diesel system on Lomond and North Everest continued to pose a challenge for Chrysaor in 2019, but the diesel system pipework replacement completed to date on both assets significantly reduced the number of PON1s associated with this system.

The Greater Britannia and J-Area assets and associated rig based activities, as well as the Southern North Sea Decommissioning activities had 16 oil or chemical unplanned releases in the first three quarters of 2019 (under ConocoPhillips UK operatorship) and a further one chemical unplanned release associated with East Irish Sea. Three unplanned releases occurred in 4Q 2019, under Chrysaor's operatorship. Of these releases, none were greater than one tonne.

Regulatory Reportable Spills to Sea, 2019

	PON1s			
	Q1	Q2	Q3	Q4
Armada	0	1	1	0
Lomond	0	2	2	1
North Everest	0	2	1	1
Valaris JU-249	1	0	0	0
Britannia	1*	0*	1*	2
J-Area	1*	2*	2*	1
EIS	0*	1*	0*	0
SNS Decommissioning	1*	0*	4*	0
Valaris 92	1*	1*	0*	0
Valaris 120	0*	0*	1*	0
Transocean 712	0*	0*	1*	0

* The first three-quarters of 2019 were under ConocoPhillips UK's operatorship.

2020 Objectives

Chrysaor has implemented a significant medium-term integration project, to combine the legacy and acquired businesses into a single integrated organisation.



Environmental Objective Overview

The focus for 2020 is to successfully deliver on the integration project, which includes updates and revision of documents within our Business Management System (BMS) to reflect the combined organisation and to allow Chrysaor to meet the requirements of ISO 14001:2015.

The Chrysaor HSEQ and Asset 2020 Plans set several additional focus and improvement areas. Those specifically related to environmental performance include:

1	Single ISO 14001:2015 Certification	Develop a strategy to integrate the two Environmental Management Systems for the combined organisation.
2	Chrysaor Carbon and Energy Reduction Strategy	Through implementation of the Strategy, develop energy transition plans for reductions in our carbon footprint and intensities across our operated assets.
3	Environmental, Social and Governance (ESG) Process	Develop and implement.
4	Environmental (E-Reps) Role	Develop, implement and identify supporting training requirements.
5	Environmental Awareness Training and Induction	Standardise the content across the organisation and assets.
6	Execute the Southern North Sea (SNS) Decommissioning Scope	To deliver: <ul style="list-style-type: none"> • Cold suspension targets, • Safe removal and transportation of 10 platforms to an onshore demolition and disposal facility, • Start onshore Phase I demolition at the Theddlethorpe Gas Terminal.
7	Decommissioning Programmes	Obtain regulatory approval for the LOGGS Area LDP2-LDP5, facilitating removal of installations in 2020 and beyond.
8	Pipeline Comparative Assessment and Environmental Appraisal	Commission to support the development of the remaining Caister Murdoch System (CMS) Area Decommissioning Programmes (CPD2-CPD3) to be delivered for statutory consultation in 2021.
9	Produced Water Optimisation	Continue work on Lomond to bring Erskine monthly average oil in water discharges to below 30mg/l.
10	Capital Projects	Continue to progress including completion of the Talbot development Environmental Statement and enable Callanish F5 construction works to facilitate first gas planned for 2021.



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