bp

North Sea Region

2019 Annual Environmental Statement

19

Introduction

This is the annual environmental statement for the BP entities which operated in the United Kingdom Continental Shelf (UKCS) in 2019. The statement covers offshore installations operated by BP entities and also installations owned and operated by third parties in the course of providing services to BP entities. [1, 2, 3]

Environmental impacts

We are committed to minimising our impact on the environment and, while environmental challenges and opportunities differ depending upon the lifecycle stage of each operating installation, our overarching goal of 'no damage to the environment' remains the same.

The North Sea oil and gas sector is subject to strict environmental regulation, which BP strives to comply with. We work closely with regulators to constantly review what we do, how we do it, and how we can do it better. Our Operating Management System is designed to drive continuous improvement in our regulatory compliance and environmental performance. Our system meets the requirements of the latest version of the international standard for environmental management ISO14001:2015. In August 2018 our external auditors, ERM CVS stated, "The operating management system established by North Sea Region Major Operating Site, conforms to the requirements of ISO 14001:2015."

Our goal

To cause no damage to the environment by:

- systematically identifying environmental impacts and seeking to avoid or minimise these;
- improving environmental performance, including reducing our carbon emissions;
- putting plans in place to reduce environmental risks associated with our projects and operations;
- working to understand developments in future environmental legislation and ensuring our continued compliance.

BP and net zero

In February 2020, BP set a new ambition to become a net zero company by 2050 or sooner, and to help the world get to net zero. The ambition is supported by ten aims.

Five aims to get BP to net zero:

1. Net zero across BP's operations on an absolute basis by 2050 or sooner.
2. Net zero on carbon in BP's oil and gas production on an absolute basis by 2050 or sooner.
3. 50% cut in the carbon intensity of products BP sells by 2050 or sooner.
4. Install methane measurement at all BP's major oil and gas processing sites by 2023 and reduce methane intensity of operations by 50%.
5. Increase the proportion of investment into non-oil and gas businesses over time.

Five aims to help the world get to net zero:

6. More active advocacy for policies that support net zero, including carbon pricing.
7. Further incentivise BP's workforce to deliver aims and mobilise them to advocate for net zero.
8. Set new expectations for relationships with trade associations.
9. Aim to be recognised as a leader for transparency of reporting, including supporting the recommendations of the Task Force on Climate-Related Financial Disclosures (TCFD).
10. Launch a new team to help countries, cities and large companies decarbonise.

[1] To fulfil the requirements of OSPAR Recommendation 2003/5, all operators of offshore installations on the United Kingdom Continental Shelf (UKCS) are required to produce an annual environmental statement which is made available to the public and the Department for Business, Energy & Industrial Strategy (BEIS), previously the Department of Energy and Climate Change (DECC).

[2] DECC Guidance and Reporting Requirements: Environmental Management System Requirements in relation to OSPAR Recommendation 2003/5 to Promote the Use and Implementation of Environmental Management Systems by the Offshore Industry.

[3] Changes to scope of reported data from 2018 are as follows:

- Data is not reported for Bruce due to transition of operatorship to Serica Energy PLC on 29th November 2018.

Our **portfolio**

Our portfolio

We have a refreshed and refocused portfolio that will now sustain production into the 2050s.

Our portfolio today is smaller than in the past but stronger, with less operating complexity, reduced risk, and better potential to increase and sustain production and returns.

Schiehallion Area

The Schiehallion Area incorporates the Schiehallion, Loyal and Alligin fields located around 175 kilometres west of the Shetland Islands. Schiehallion and Loyal are developed through the Glen Lyon floating production, storage and offloading (FPSO) vessel. Alligin was sanctioned in 2018 and was developed as a two-well subsea tieback to the Glen Lyon, achieving first oil in late 2019.

Production from the Schiehallion Area was shut-in between 2013 and 2017 to allow for the Quad 204 project – a multi-billion-pound investment by BP and partners to completely redevelop the hub and maximise production from the fields. Quad 204 saw the removal of the old FPSO, construction and installation of the Glen Lyon FPSO and renewal of much of the subsea infrastructure network.

Through the Quad 204 project, BP and partners expect to unlock a further estimated 450 million barrels of resources, extending the life of the fields out to 2035 and beyond.

Clair Phase One

With an estimated seven to eight billion barrels of oil in place, the Clair field is the largest oilfield on the UK Continental Shelf. The field, located 75 kilometres west of the Shetland Islands, was discovered in 1977, but challenging reservoir characteristics and the technological limits of the time meant it was the mid-1990s before the field saw extensive drilling and 2001 before BP and partners approved a development plan. Production from the Clair field began in 2005 through the Clair Phase One platform which was the first fixed platform west of Shetland.

Clair Ridge

The physical size of the Clair field dictates development via a phased approach. Clair Ridge is the second phase of development. The bridge-linked platforms, which delivered first oil in November 2018, are designed to recover an estimated 640 million barrels of oil and ramp up to 120,000 barrels of oil per day at peak production. The new facilities, which are designed for 40 years of production, required capital investment in excess of £4.5 billion. BP and partners are now considering a third phase of development in the Clair field.

Foinaven

The Foinaven field is located 190 kilometres west of Shetland in water depths of up to 500 metres. The field was discovered in 1990 and sanctioned for development in 1994. It was the first deepwater development on the UKCS and the first west of Shetland. First oil from the field was in November 1997.
The pioneering fast-track development was based on a network of subsea wells linked via a subsea network of pipelines, control umbilicals and risers to the Petrojarl Foinaven FPSO.

Eastern Trough Area Project (ETAP)

ETAP ranks as one of the largest and most commercially complex North Sea oil and gas developments of the past 20 years; multiple fields with varying ownership sharing a central processing facility (CPF). BP operates six of the seven ETAP fields; Machar, Madoes, Mirren, Mungo, Monan and Marnock. The non-operated Seagull field (BP ownership share 50%) will be tied back to the ETAP CPF. We are exploring options to develop another new field, Murlach, through the ETAP hub.

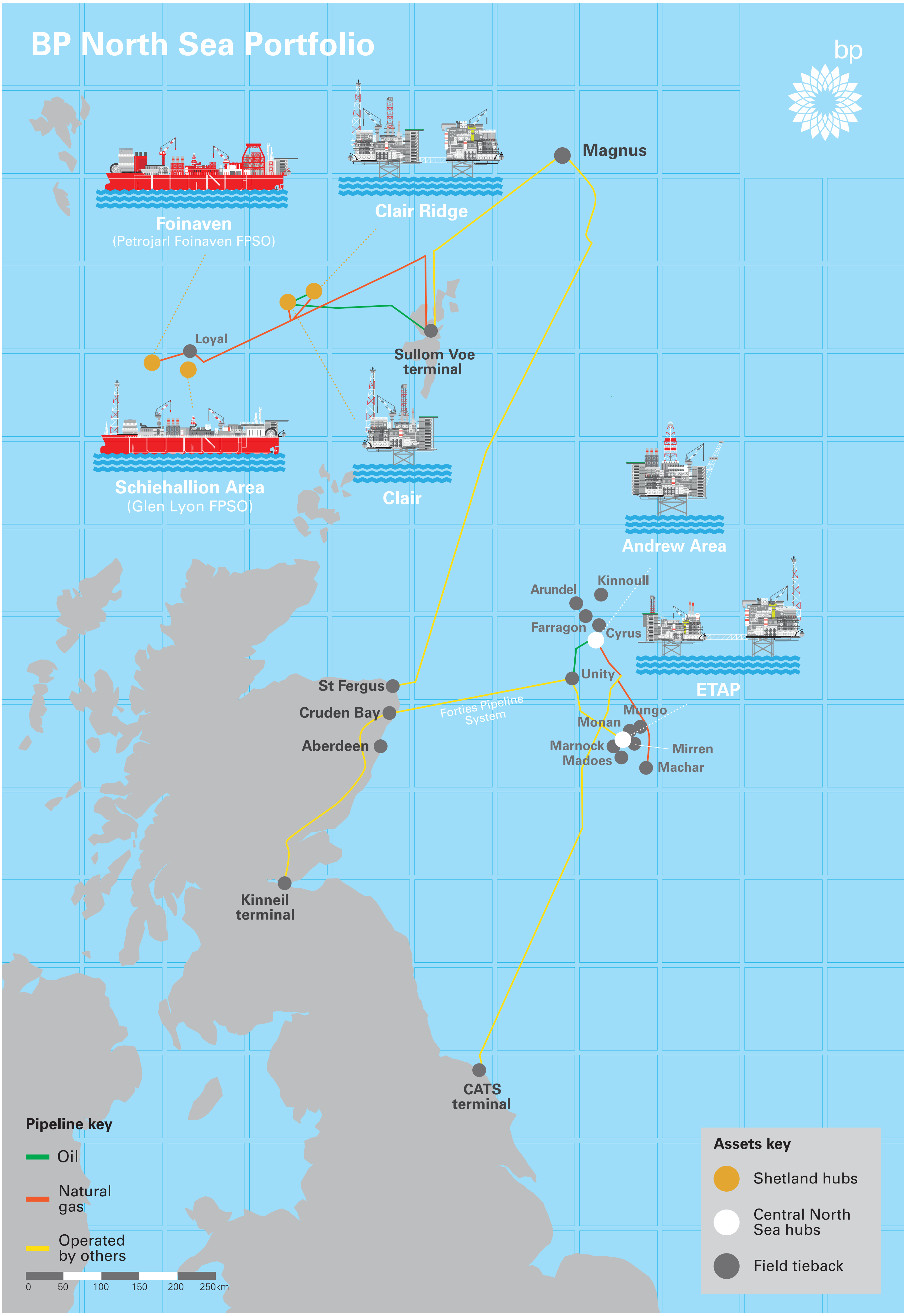
ETAP came on stream in July 1998 with an estimated production life of 20 years. However, a multi-million-pound investment programme in 2015 secured its future well into the 2030s.

In the two decades of operations, more than 550 million barrels of oil equivalent (gross) have been produced from the BP-operated ETAP fields.

Andrew Area

The Andrew area includes the Andrew, Arundel, Cyrus, Farragon and Kinnoull fields which all produce through the Andrew platform. The field started production in 1994. Andrew, Cyrus and Farragon were shut in in mid-2011 to allow for the Andrew Area Development (AAD), a major brownfield project enabling the Kinnoull field, located 28 kilometres to the north, to be developed through the existing facilities. The ADD also included extensive new subsea infrastructure, a new 750-tonne process module and structural strengthening of the platform. In 2017, the Arundel field came on stream - only 18 months after project sanction.

In January 2020, BP announced it has agreed terms to sell its interests in the Andrew area to Premier Oil. Subject to the receipt of regulatory and other third-party approvals, BP aims to complete the sale and transfer of operatorship of the assets at the end of the third quarter of 2020.


BP North Sea Portfolio
bp
Magnus
Clair Ridge
Foinaven
(Petrojarl Foinaven FPSO)
Loyal
Sullom Voe
terminal
Schiehallion Area
(Glen Lyon FPSO)
Clair
Andrew Area
Arundel
Kinnoull
Farragon
Cyrus
Unity
ETAP
St Fergus
Cruden Bay
Forties Pipeline
System
Aberdeen
Mungo
Monan
Marnock
Madoes
Mirren
Machar
Kinneil
terminal
CATS
terminal
Pipeline key
Oil
Natural
gas
Operated
by others
0
50
100
150
200
250km
Assets key
Shetland hubs
Central North
Sea hubs
Field tieback

1. Releases to the Environment

Our goal is "no damage to the environment", which includes seeking to avoid unpermitted releases to the environment. However, during the course of conducting operations, hydrocarbons and chemicals can be accidentally released. We monitor the number and volume of such releases closely and investigate the causes, so we can avoid similar events in the future. In 2019, we reported a 27% reduction in unpermitted releases from offshore installations to the Regulator with 62 releases in 2019 compared to 85 in 2018. This reduction is shown in Figure 1 below.

Number of releases of hydrocarbons and chemicals

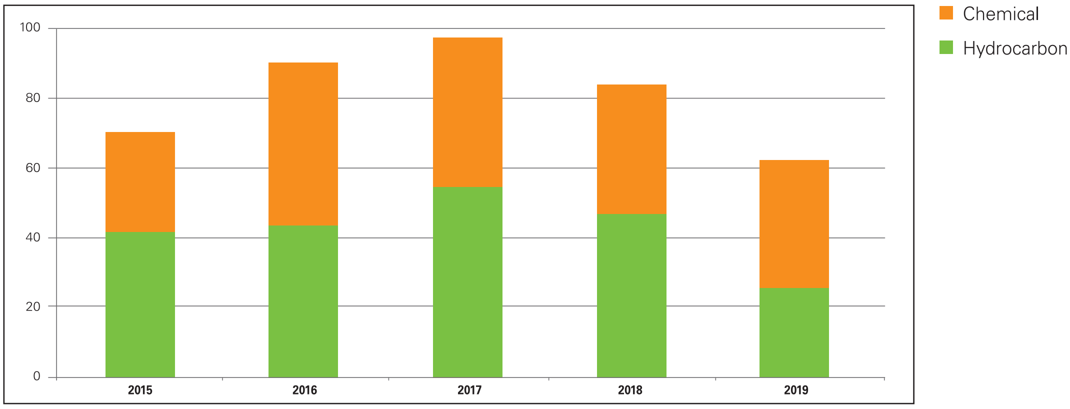


Figure 1: Total number of releases of hydrocarbons and chemicals between 2015 and 2019

There were 35 chemical releases in 2019, one less than in the previous year. The number of hydrocarbon releases also decreased from 49 in 2018 to 27 in 2019. Of the 27 oil releases in 2019, only 11% were releases of crude oil. The releases are from crude oil and utility systems installed to support the production of the oil and gas and consisted of hydraulic oil, diesel and oil-based lubricants. In total, 0.1 tonnes of oil and oil-based products was released to the environment in 2019.

As Figure 2 shows, the overall reduction in the number of oil and chemical releases was driven by decreases in releases on Clair Phase 1 and Foinaven. This meant that the number of releases decreases from 68 in 2018 to 44 in 2019 from operations. There was a minor increase from 17 PON1s reported in 2018, to 18 for 2019 from mobile drilling operations.

Total number of hydrocarbon and chemical releases reported to the regulator

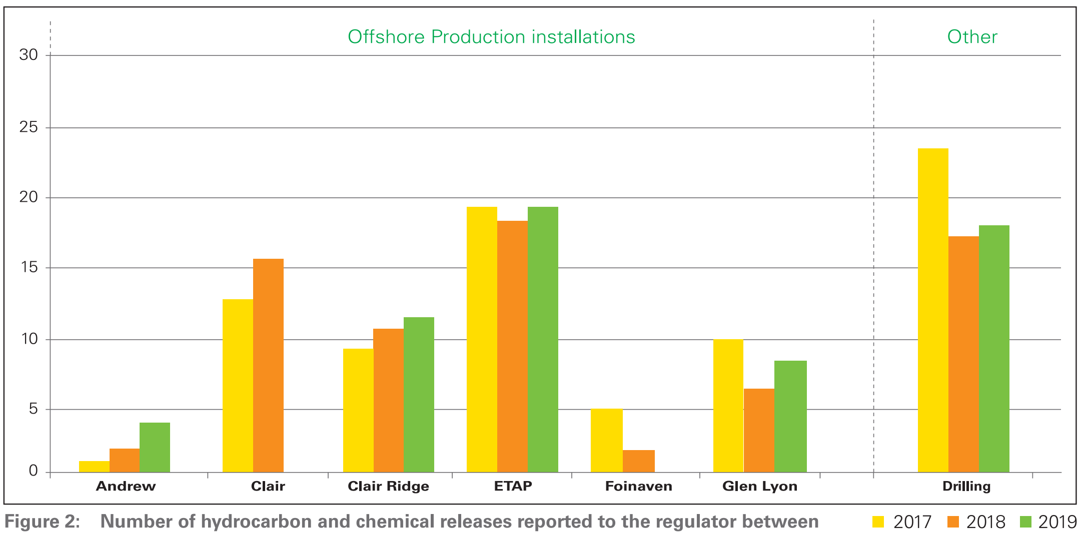


Figure 2: Number of hydrocarbon and chemical releases reported to the regulator between 2017 and 2019 for individual operated installations and mobile drilling rig activities

NOTE The vast majority of emissions and releases reported in this Statement under the category "drilling" relate to operations undertaken by third parties such as drilling contractors from installations owned and operated by those third parties in the course of providing services to BP entities.

1. Releases to the Environment (cont'd)

In 2019, the total quantity of hydrocarbons and chemicals released from offshore operations in the UKCS declined by approximately 39% to less than 29 tonnes (Figure 3). The primary cause was a 39% decrease in the mass of chemicals released from approximately 46,000 kg to 28,000 kg. The mass of hydrocarbons released also declined from approximately 0.4 te to 0.1 te, a 75% decrease on the previous year.

Quantity of hydrocarbons and chemicals unrecovered (tonnes)

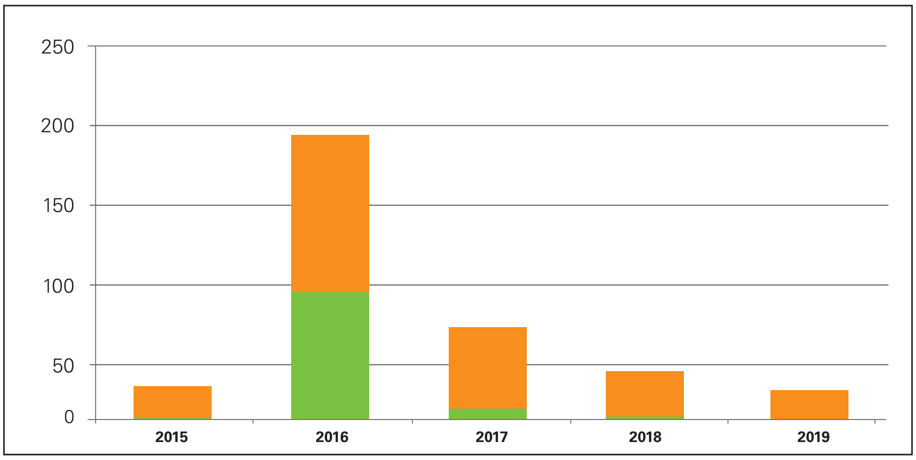


Figure 3: Total quantity (tonnes) of unrecovered hydrocarbon and chemical releases between 2015 and 2019

Table 1 shows the number of hydrocarbon and chemical releases greater than two tonnes in 2019. In total there were two releases greater than two tonnes. The largest release totalled 16.89 tonnes and related to a water-based hydraulic control fluid release. There were four releases greater than two tonnes in 2018.

Offshore Installation/Field	Quantity Released (tonnes)	Hydrocarbon or chemical	Brief details
Andrew	8.56	Chemical	Subsea Chemical Systems – Fittings / Connections
Glen Lyon	16.89	Chemical	Hydraulics – SCM Failure

Table 1: Details and quantity of chemical and hydrocarbon releases greater than 2 tonnes (chemicals released are of low toxicity to the environment)

These releases resulted in the increase in the quantity of chemicals released from the Andrew and Glen Lyon installations shown in Figure 4 below.

Total hydrocarbon and chemical unrecovered releases (tonnes)

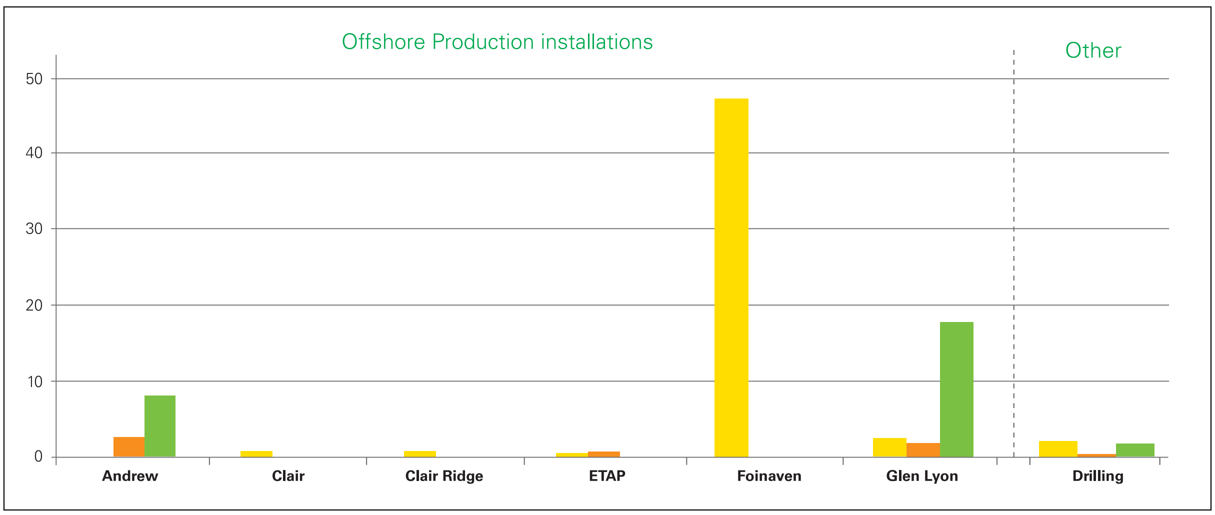


Figure 4: Quantity (tonnes) of hydrocarbon and chemical releases reported to the regulator between 2017 and 2019 for individual operating facilities and drilling activities

2. Atmospheric emissions

Atmospheric emissions occur in our operations, mainly through combustion of fuel gas to generate power and through flaring. We track and report our greenhouse gas (GHG) emissions and non-GHG emissions. We work to manage our emissions to air principally by focusing on plant reliability and energy efficiency.

We report GHG emissions on a carbon dioxide (CO_2) equivalent basis, including CO_2 and methane. BP continues to deliver Sustainable Emissions Reductions (SERs) and in 2019 we delivered approximately 27,000 tonnes CO_2 equivalent of emissions reductions, for example, reducing the duration of turbine diesel testing, removing seawater injection and optimising export compressor start up.

Total greenhouse gas emissions (millions of tonnes of CO_2 equivalent)

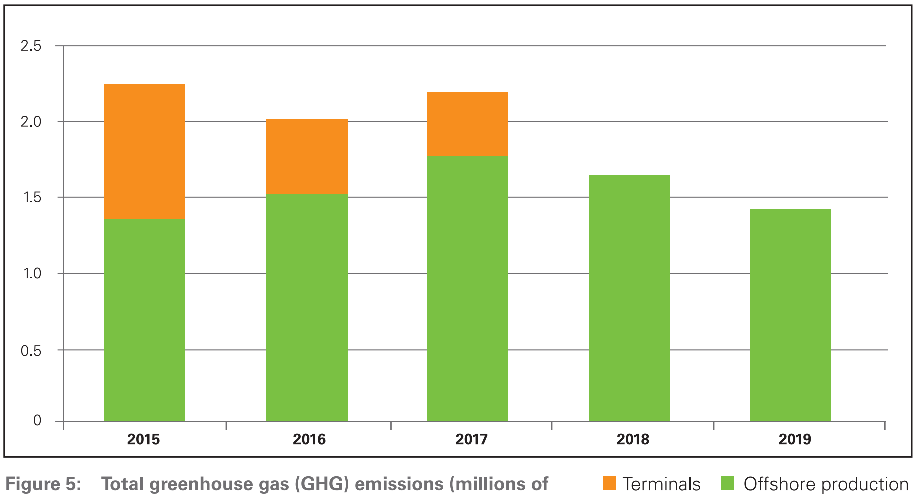


Figure 5: Total greenhouse gas (GHG) emissions (millions of tonnes of CO_2 eqivalent) between 2015 and 2019

Greenhouse gas emissions by asset (tonnes of CO_2 equivalent)

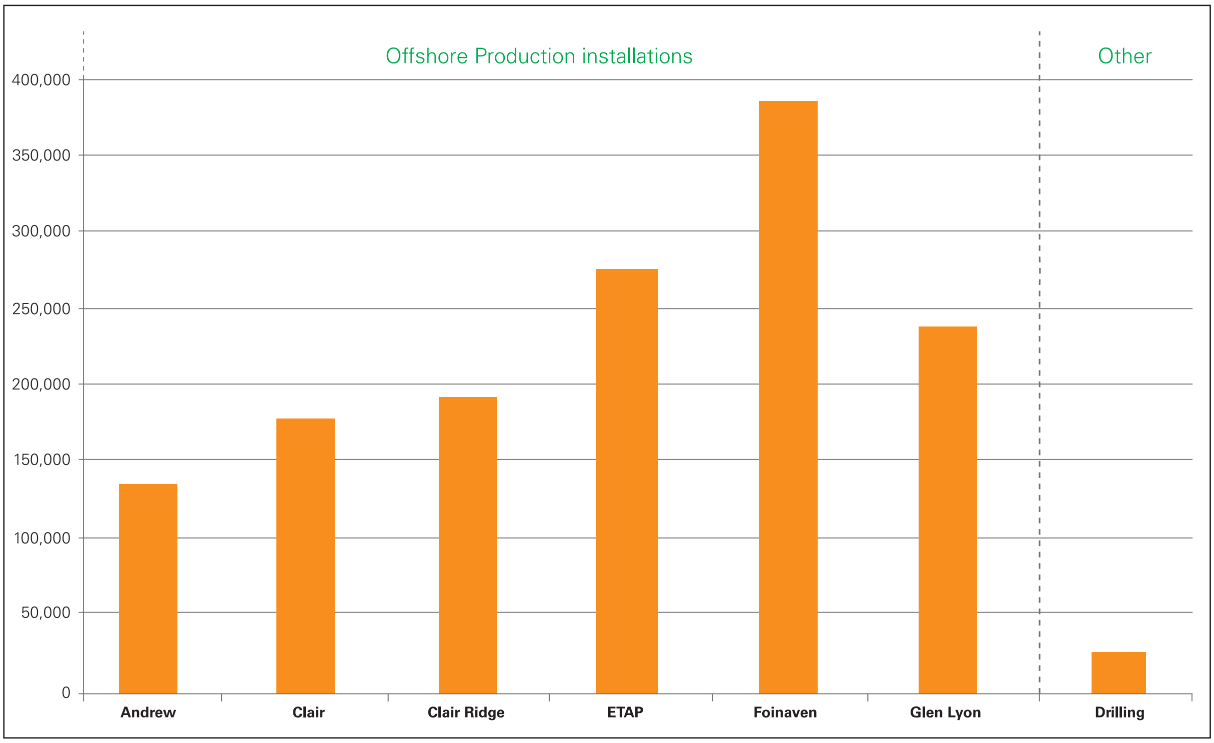


Figure 6: GHG emissions for individual operating facilities and drilling activities during 2019.

2. Atmospheric emissions (cont'd)

Figure 7 below shows the ongoing improvement in offshore GHG intensity compared with previous years. This was a result of improved plant reliability and reduced flaring. This trend continued in 2019 which included the start-up of operations on Clair Ridge, which required increased flaring to enable the safe start-up of operations, and the Bruce divestment reducing overall gas export.

Greenhouse gas emissions (tonnes of CO_2 equivalent per 1,000boe)

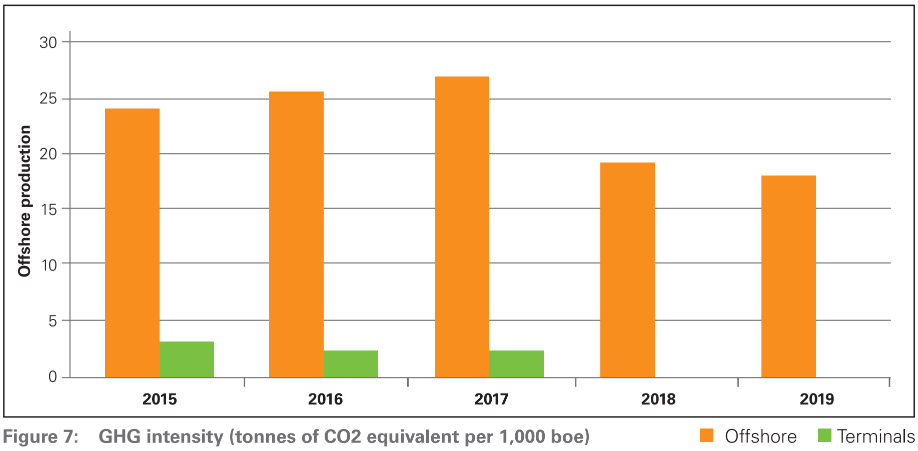


Figure 7: GHG intensity (tonnes of CO2 equivalent per 1,000 boe) for offshore installations and onshore terminals between 2015 and 2019.

Flaring of gas on offshore installations is essential for safety reasons. We seek to minimise flaring from our operations to maximise resource recovery and ensure compliance with consented flaring limits. In 2019, around 550,000 tonnes of gas was flared (see Figure 8 below), a slight increase on the previous year caused by commissioning Clair Ridge and reliability issues with the Glen Lyon compression trains causing excess gas to be routed to flare. We are actively working to reduce our flare activity for example: the vapour recovery system on Clair Ridge was commissioned in 2019, effectively reducing flaring to <2te / day, and flare reduction measures will be installed on Glen Lyon in 2020. Lastly BP has adopted a low flaring mindset which has already reduced GHG from flare by a further 10,000 te/year.

Total production gas flared (tonnes)

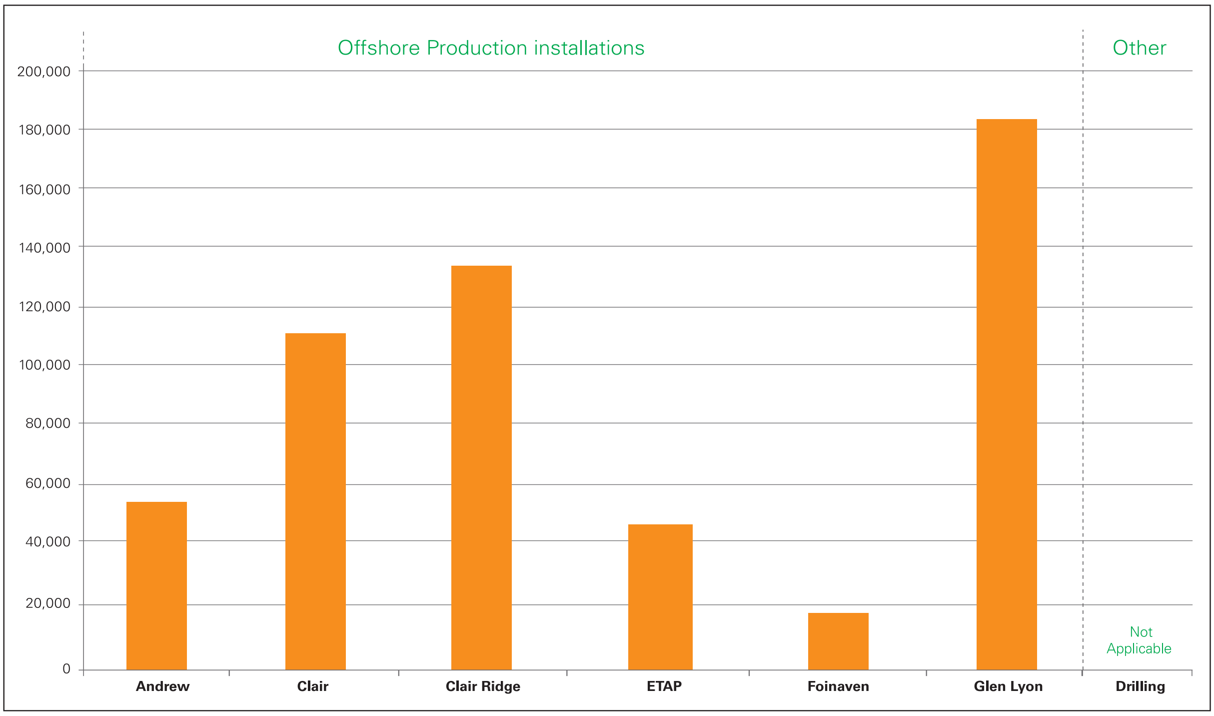


Figure 8: Total production gas flared (tonnes) for individual operated installations during 2019

2. Atmospheric emissions (cont'd)

The non-GHG emissions we track include Nitrogen Oxides, Sulphur Oxides, Carbon Monoxide and Volatile Organic Compounds. The emissions of these substances are shown in Figure 9 below. Total non-GHG emissions for Glen Lyon is 13,987 tonnes, the majority of which is Nitrogen Oxides.

Total non-greenhouse gas emissions (tonnes)

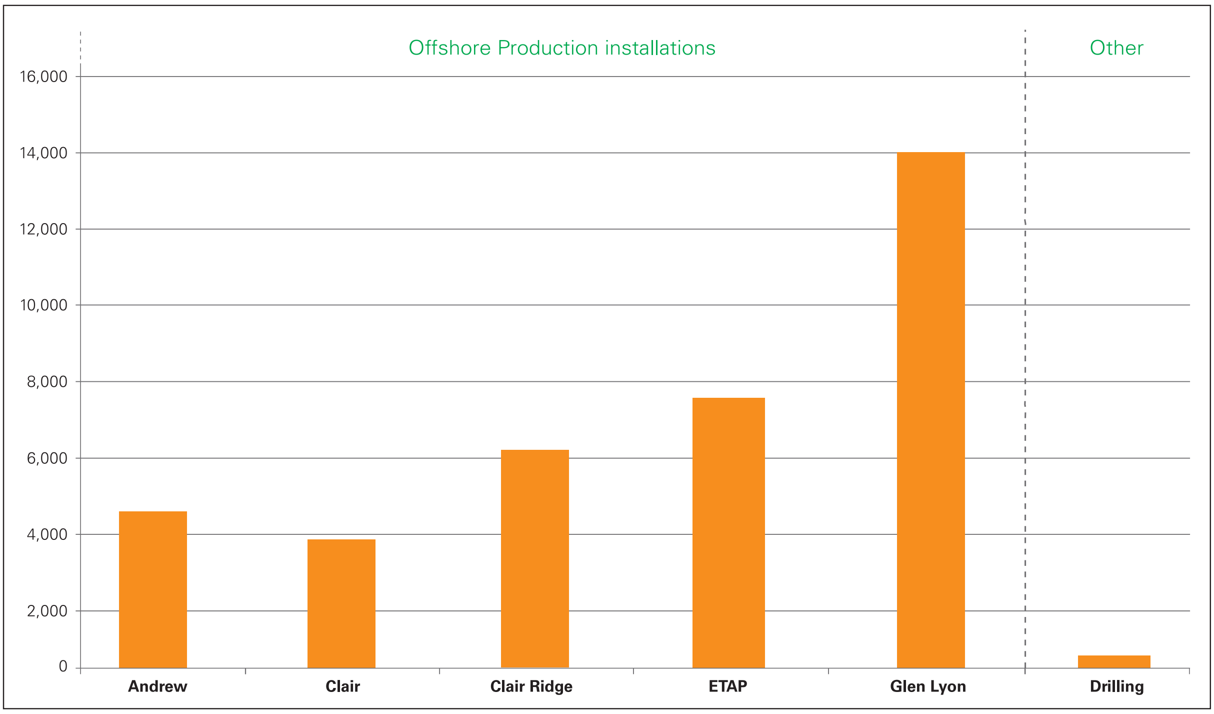


Figure 9: Total non-GHG emissions (tonnes) for individual operated installations and drilling activities during 2019

3. Permitted discharges

We use chemicals offshore to improve the flow of fluids; to facilitate the separation of materials; to prevent the degradation and fouling of process equipment and in control systems. The composition of these chemicals is diverse and their usage and discharge are permitted by the Regulator. Our production chemical usage increased approximately 14% in 2019, whilst discharge increased by around 72% in 2019, as shown in Figure 10 below.
The increase in production chemical use was primarily due to increased operational usage from the Clair and Glen Lyon installations.

Total production chemicals used and discharged by offshore facilities (tonnes)

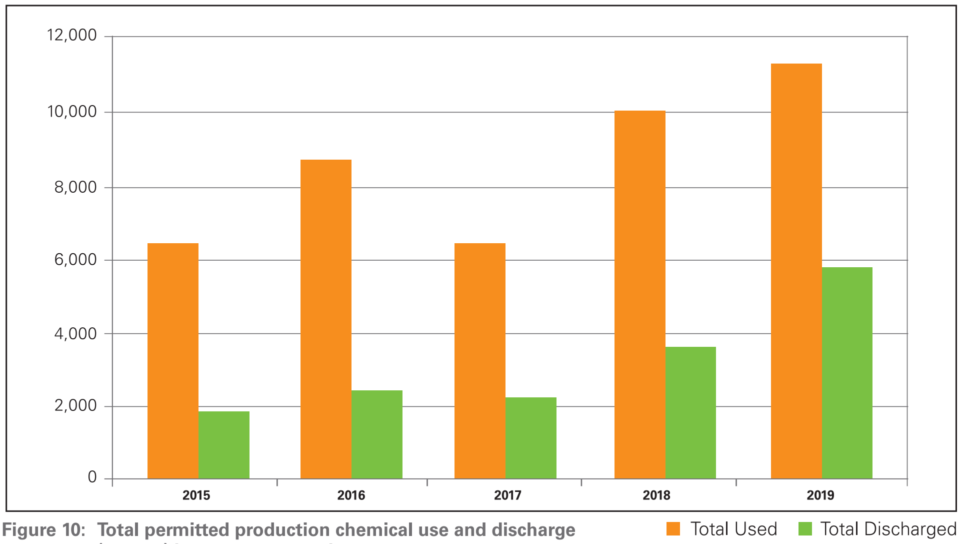


Figure 10: Total permitted production chemical use and discharge (tonnes) between 2015 and 2019

Figure 11 below shows the total use and discharge of production chemicals by operated installation in 2019. Clair chemical use is primarily related to the management of hydrogen sulphide. A significant proportion of chemical use on Glen Lyon relates to additive use in water-injection systems as part of microbiological control. Subsea chemical use and discharge relates to flushing of pipelines to remove hydrocarbons before maintenance and inspection activities are undertaken and use in hydraulic control systems.

Total permitted production chemicals used and discharged by offshore facilities (tonnes)

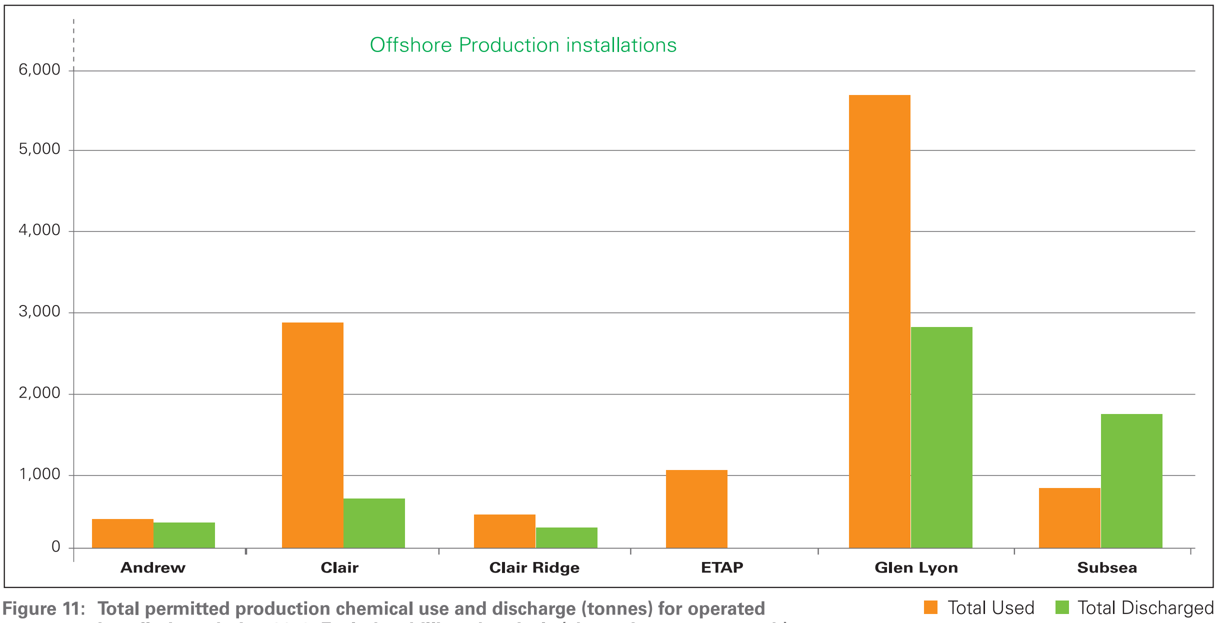


Figure 11: Total permitted production chemical use and discharge (tonnes) for operated installations during 2019. Excludes drilling chemicals (shown in separate graph)

3. Permitted discharges (cont'd)

Fluids produced from oil producing wells often contain large quantities of water as well as hydrocarbons. The water and hydrocarbon are separated during processing. Hydrocarbons are exported and the remaining produced water, which contains trace amounts of oil, is either reinjected into the wells or discharged to sea in accordance with environmental permits. In order to minimise oil discharges, the majority of our offshore installations have been designed to reinject some or all produced water.

Figures 12 and 13 summarise the produced water discharges. Total produced water discharged by BP operated installations increased by 89% in 2019. This was primarily related to Glen Lyon increasing the mass of produced water being discharged by over 200% due to issues associated with sand being flowed back to the installation.

Total produced water discharged (millions of tonnes)

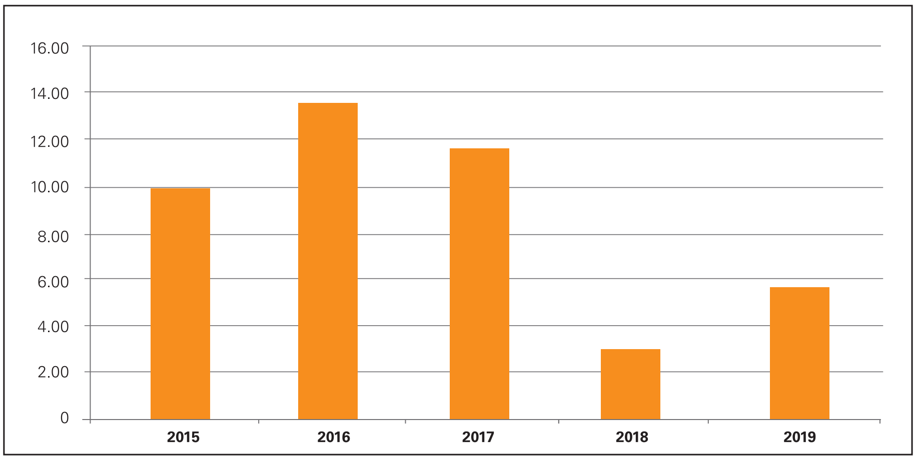


Figure 12: Total produced water discharged (millions of tonnes) between 2015 and 2019

Total produced water discharged (millions of tonnes)

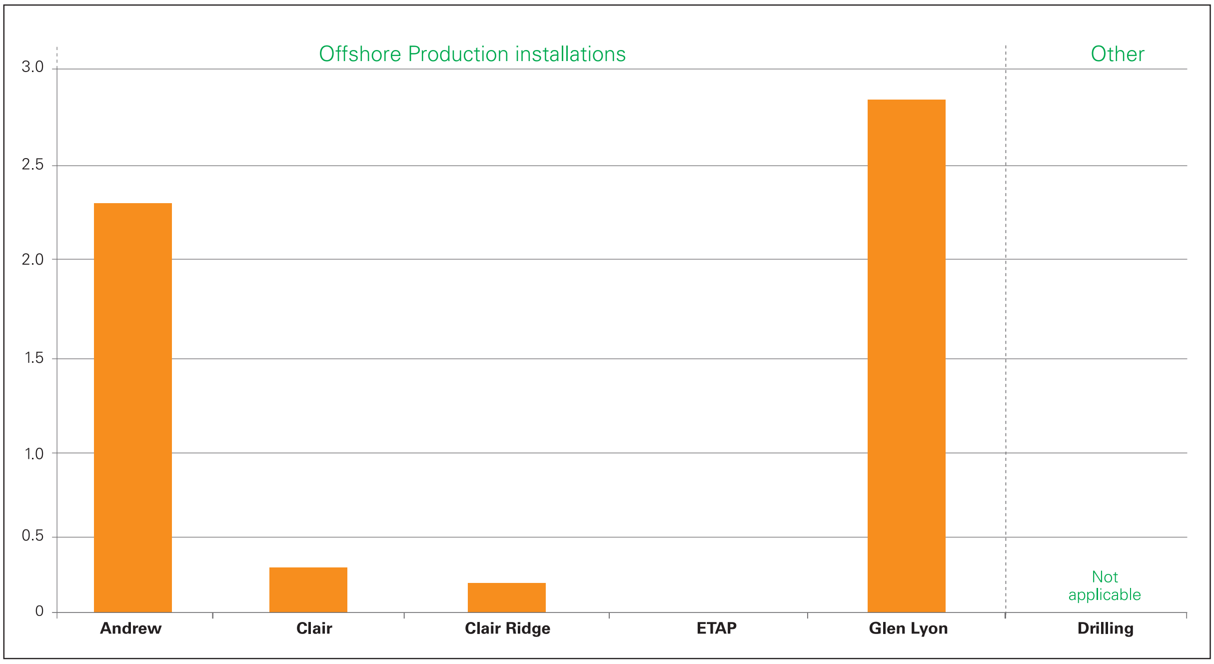


Figure 13: Total produced water discharges (millions of tonnes) for operating facilities during 2019.

3. Permitted discharges (cont'd)

The total amount of oil in produced water that can be discharged and concentrations of oil in produced water are governed by the Offshore Petroleum Activities (Oil Pollution Prevention and Control) Regulations 2005 as amended and specified in the permits for each operating installation. Where such installations discharge produced water, the permits require the monthly average concentrations of oil to be below 30 milligrams (mg) of oil per litre.

Figure 14 below shows the annual average oil in produced water concentrations for each operating installation in 2019. All installations except for Clair Ridge achieved the 30 mg/l threshold for discharges to sea, with Clair Ridge returning an annual average of 30.4 mg/l. This associated discharge was limited resulting in less than four tonnes of oil being discharged to sea in 2019 (see Figure 15). The ETAP installation reinjects 100% of its recovered produced water and therefore has no associated discharge.

Annual average oil concentration in produced water discharged (mg/l)

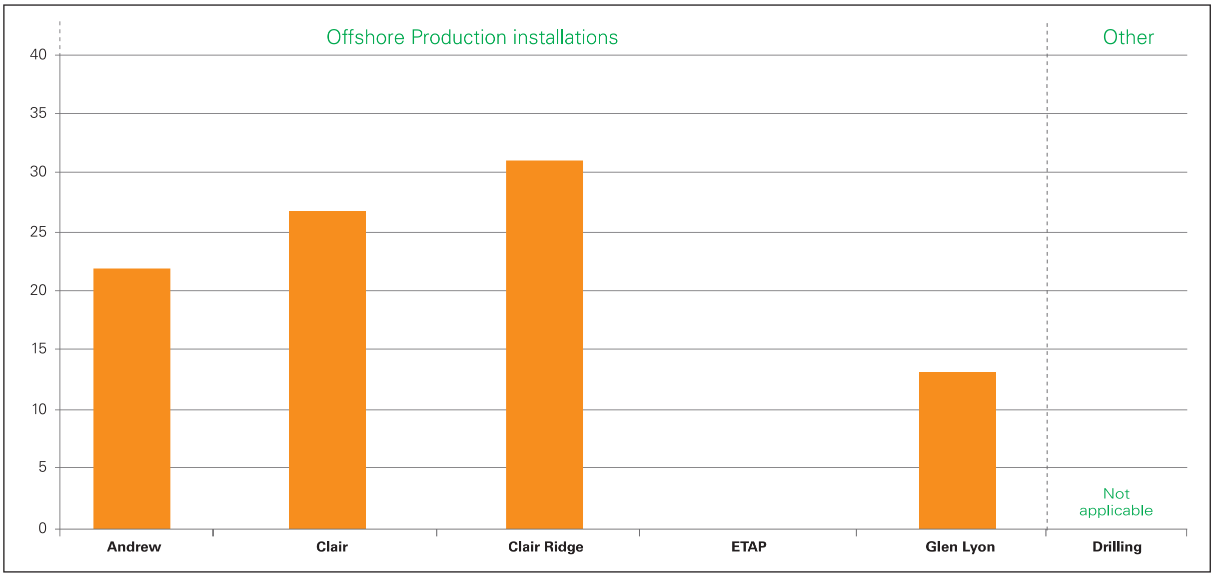


Figure 14: Annual average oil in produced water discharge (mg/L) for operating assets during 2019

Figure 15 shows the total oil in produced water discharged for our operated installations during 2019. Of all the produced water discharged by our operated installations, oil makes up less than 0.002% of the total mass. Andrew does not have reinjection facilities and therefore 100% of produced water at an annual average of 21.7 mg/l was discharged to sea (Figures 14 and 15).

Total oil in produced water discharged (tonnes)

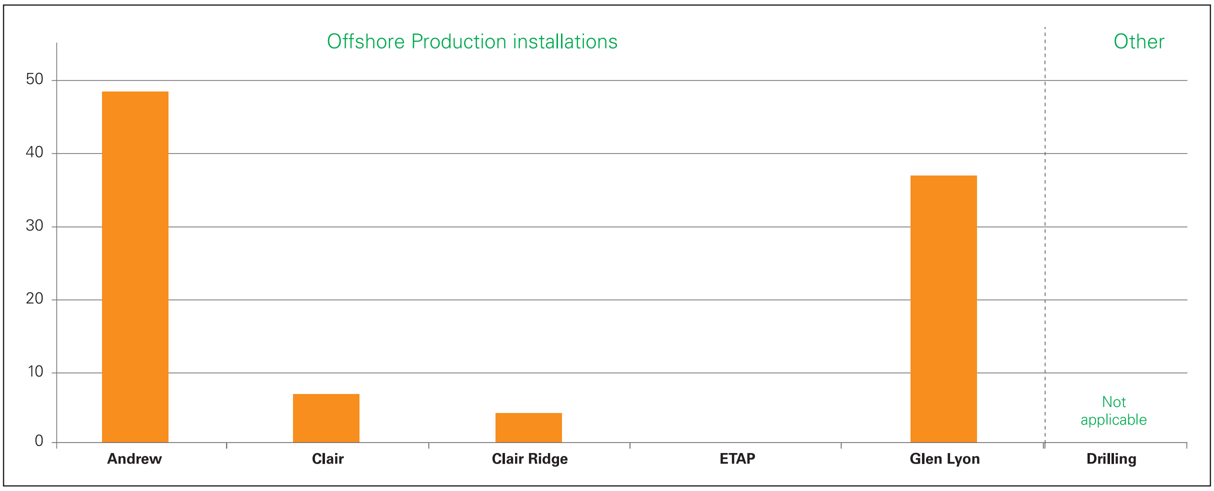


Figure 15: Total oil in produced water discharged (tonnes) within total produced water discharged (Figure 13) for our operated installations during 2019

4. Waste

Waste from our operations is segregated and, where possible, reused or recycled. Special waste includes paints, hazardous chemical, oils, batteries, aerosols, heavy metals, wax from pigging operations and oily waste. Quantities of special waste generated by the operating installations are shown below in Figure 16. Clair Ridge had higher than normal quantities of special waste due to commissioning, start-up work and drilling activities, and associated waste liquids and sludge.

Special waste from operating installations (tonnes)

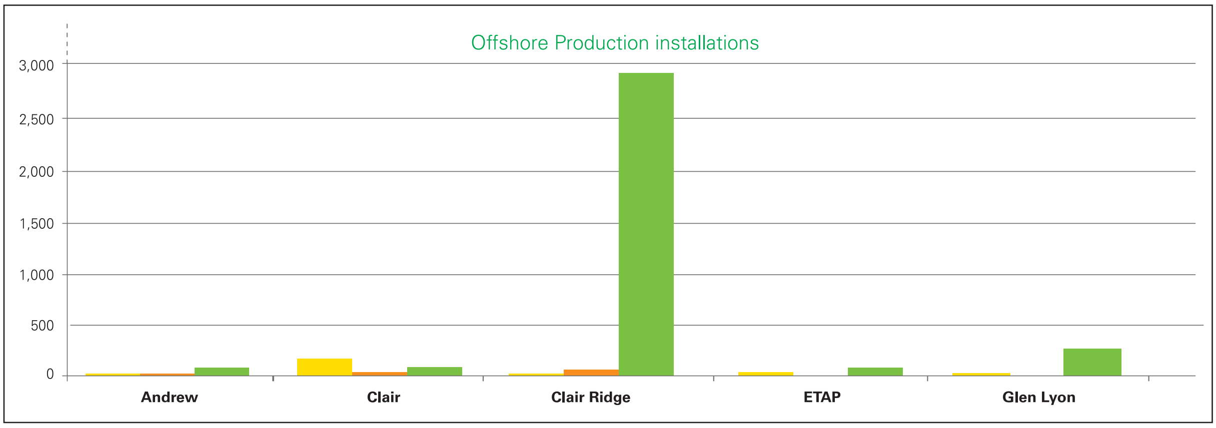


Figure 16: Special waste (tonnes) reported for operated installations during 2019. Includes drilling waste from Clair Ridge only (other drilling waste shown on separate graph)

Recycled Landfill Treatment

Non-special waste includes segregated recyclables (paper, packaging, wood etc.), general waste (i.e. accommodation waste) and uncontaminated scrap metals. Quantities of non-special waste generated by our operated installations are shown in Figure 17 below. A higher volume of non-special waste, including recyclable wood and scrap metal, and general waste, was generated at Clair Ridge due to commissioning, start-up work and drilling activities.

Non-special waste from operating facilities (tonnes)

Excludes drilling waste (shown on separate graph)

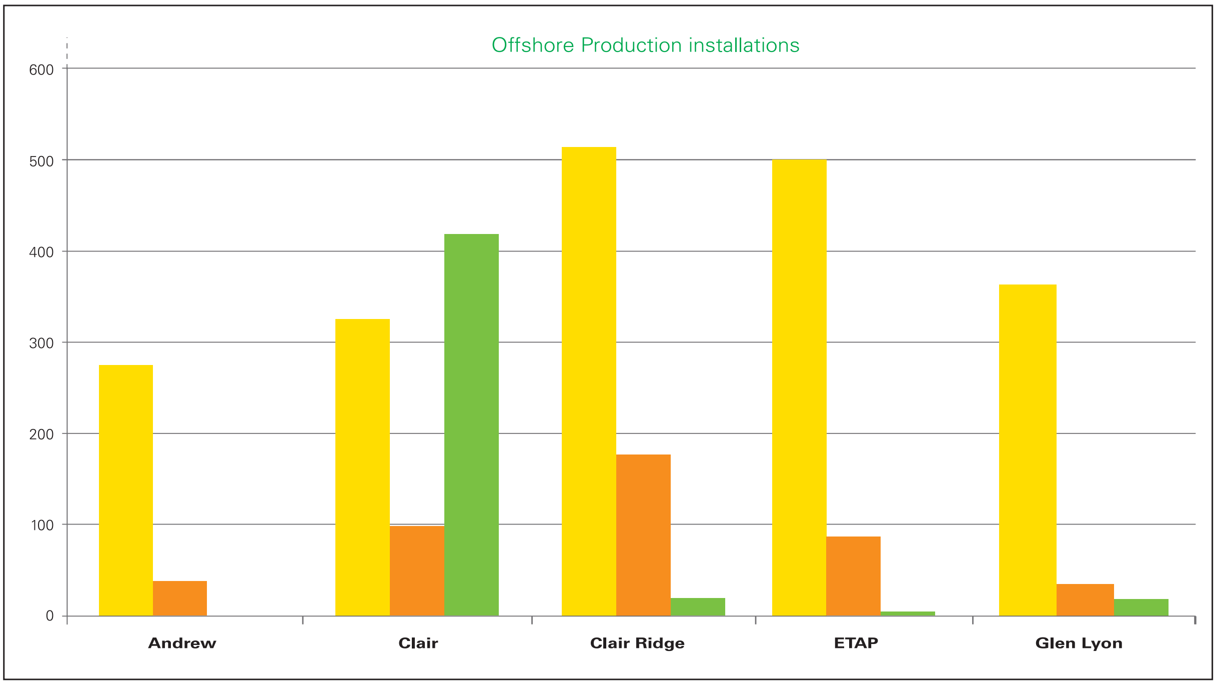


Figure 17: Non-special waste (tonnes) generated for operated installations during 2019. Includes drilling waste from Clair Ridge only (other drilling waste shown on separate graph)

Recycled Landfill Treatment

5. Drilling specific environmental performance

The drilling of seven wells came to an end in 2019 and permit returns were filed with OPRED. Two wells were in the Schiehallion Field (West of Shetland) and were drilled using the Deepsea Aberdeen Mobile Offshore Drilling Unit (MODU). Three wells were in the Clair Ridge field (West of Shetland) and were drilled from the Clair Ridge platform. Two wells were in the Vorlich Field (Central North Sea) and were drilled from the Paul B Lloyd Junior semi-submersible drilling rig. The Normand Subsea support vessel carried out well intervention work in the Schiehallion field and the Well Enhancer Light Well Intervention vessel carried out well intervention work in the Machar field.

As part of drilling and intervention operations, approximately 22,000 tonnes of chemicals were used, of which approximately 9,500 tonnes were discharged in accordance with environmental permits as shown in Figure 18 below. The majority of these chemicals were completion brines and water-based mud chemicals classified by OSPAR as posing little or no risk to the environment (PLONOR).

Drill cuttings and drilling chemicals (tonnes)

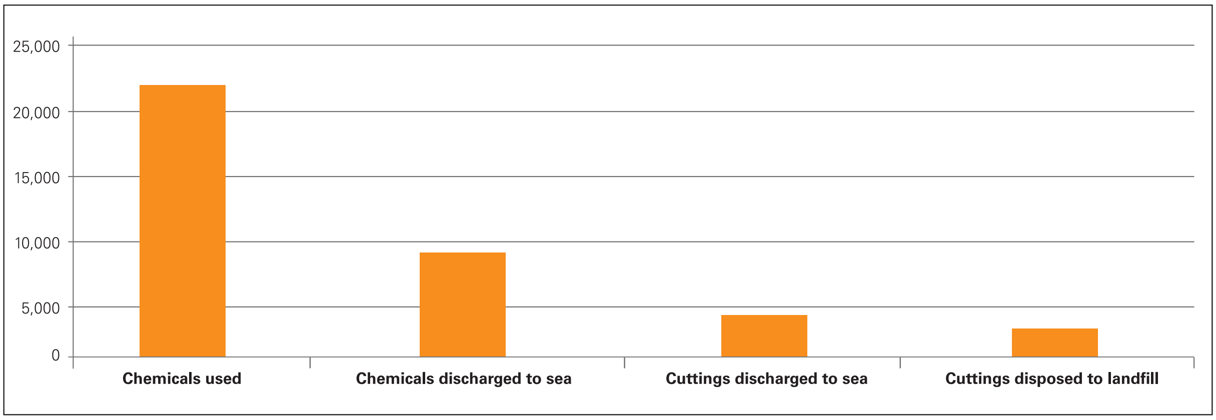


Figure 18: Total drill cuttings produced and drilling chemicals used (tonnes). No drill cuttings were reinjected as part of our drilling activities during 2019

Drilling waste includes special wastes such as hazardous completion, workover and drilling fluid additives. Non-special wastes are predominantly non-hazardous workover and completion drilling fluids and brines. In 2019, 95.4% of total drilling activity waste was either recycled or treated- see Figure 19 below.

Operational drilling waste from UK mobile drilling rigs owned and operated by third parties (tonnes)

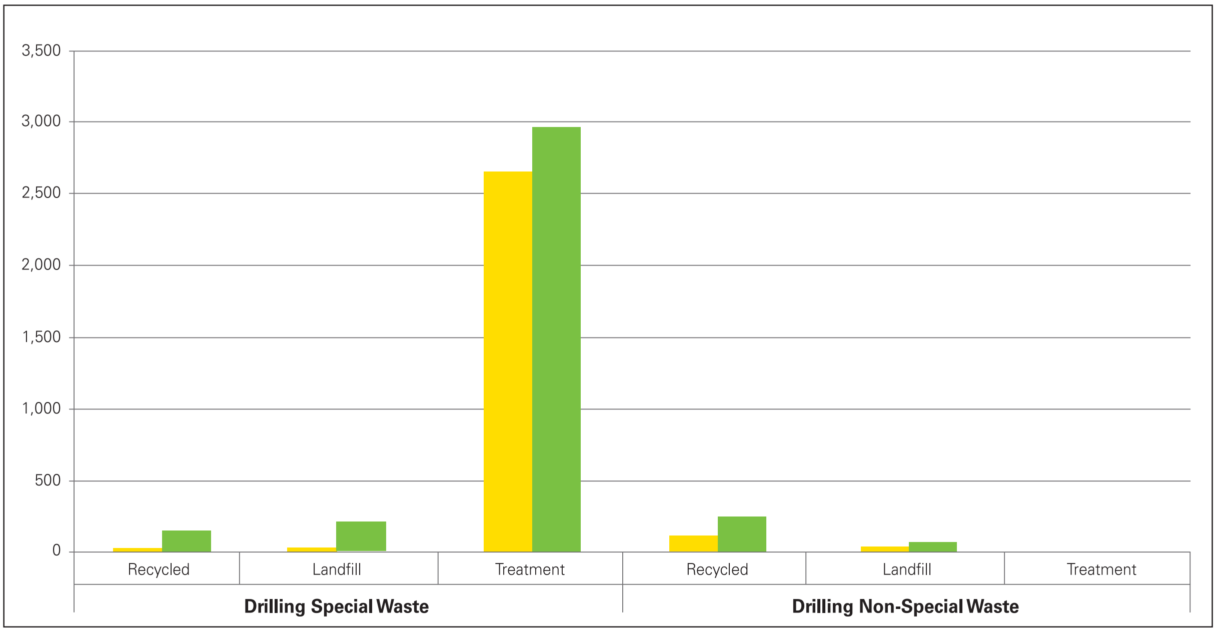


Figure 19: Special and non-special waste (tonnes) generated during drilling activity in 2019. Waste generated at Clair Ridge from drilling activities is included in Section 4, Waste.