

# TEPUK Operational Environmental Statement 2019



# Foreword

It is my pleasure to present to you our Operational Environmental statement which provides an overview of the environmental performance of our operations for 2019.

With first gas from our Culzean asset, 2019 was a busy year for Total E&P UK (TEPUK). In addition to our focus on safe and reliable operations, we have also strengthened our commitment to safeguarding and protecting the environment.

Over the past year, Total, as a group, has continued to concentrate on climate concerns which are integral to our four areas of strategic focus: natural gas, low-carbon electricity, oil products and carbon neutrality. We have also committed to reach net zero emissions in our operations by 2050 or sooner.

Our ambition is to become the responsible energy major, providing as many people as possible with energy that is cleaner, more reliable and more affordable. TEPUK has set its own energy efficiency objectives and emission reduction targets to support the Group in achieving this ambition.

TEPUK is committed to achieving our environmental goals, we strive to introduce new ways of working and utilising new technologies to continually improve our environmental performance.

In this Operations Environmental Statement, we are proud to display our transparency and accountability to our stakeholders and our dedication to employing the best environmental practices within our operations.

Jean-Luc Guiziou Managing Director

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# Introduction

The Total Group is a global integrated energy producer and provider with operations in more than 130 countries with over 100,000 employees. We are a leading international oil and gas company and a major player in solar energy with SunPower and Total Solar. The Group discovers, produces, transforms, markets and distributes energy in a variety of forms, to serve the end customer.

> Total E&P UK Limited (TEPUK) is one of the largest exploration and production subsidiaries of the Total Group and provides a significant quantity of the UK's oil and gas from their offshore operational assets in the North Sea. Onshore, we operate the Shetland Gas Plant which was responsible for delivering more than 5% of the UK's gas supply.

This report is the 2019 annual environmental statement for TEPUK's activities which provides the environmental performance of our operated facilities and drilling activity in the UKCS (Figure 1). The report has been prepared in accordance with the OSPAR Recommendation 2003/5 regulatory requirements.

The data provided in this report has been previously reported to the UK environmental regulator (OPRED) via the Environmental Emissions Monitoring System (EEMS) for offshore operations.



Recent Discoveries in the British North Sea

# **Offshore Operations**

# Northern North Sea

TEPUK's Northern North Sea (NNS) hub lies 160 km east of the Shetland Islands and 440 km northeast of Aberdeen in Block 3/9a.

> Alwyn North Complex

# Alwyn

Our Alwyn North field first produced oil and gas in 1987. Alwyn North is the hub of the Alwyn Area and the support centre for the neighbouring Dunbar, Ellon, Grant, Nuggets, Forvie North, Jura and Islay fields. These neighbouring fields were brought onstream through innovation and technological advances, thereby extending the life of the Alwyn Area past 2020.

The Alwyn North field comprises two bridge-linked platforms in a water depth of 126m. North Alwyn A (NAA) provides drilling and accommodation facilities, while North Alwyn B (NAB) provides processing facilities. NAB supplies other Alwyn Area fields with power, water and chemicals via a network of subsea cables and pipelines.

The Alwyn Complex has facilities for the re-injection of both drill cuttings and produced water. Untreated oil and gas from neighbouring Alwyn Area fields is piped to NAA and across the bridge to NAB for processing and export to shore. Oil from NAB is exported to the Sullom Voe Terminal in Shetland via the Cormorant Alpha platform and the Brent pipeline system. Gas from NAB is exported to the St Fergus Gas Terminal on the north-east coast of Scotland via the Frigg pipeline system.

Nuggets is a subsea field development of four gas-bearing accumulations located 20 km south of Dunbar. Brought into production during over 2002-2003, the gas from Nuggets is piped back to Alwyn via a 67 km subsea pipeline.

Forvie North is a gas condensate development which started production in January 2006. It comprises subsea production facilities and a 32 km pipeline tied back to the NAB platform.

Jura is a subsea gas condensate development located 30 km south of the Alwyn. The development is located in 113m water depth and consists of a two well subsea tie-back to the Forvie manifold via a 3 km bundle assembly. First gas was achieved in May 2008.



Islay is TEPUK's latest development in the Alwyn field and is a gas and condensate field located just over 30 km to the south of Alwyn. The development consists of a single well tied back with a 6 km gas and condensate pipeline to the Forvie subsea manifold with gas and condensate transported via the existing pipeline to NAB. First production from this field was achieved in 2012.



## Dunbar

The Dunbar field is situated 22 km south of Alwyn and first produced oil and gas in 1994. Dunbar comprises a platform together with well and accommodation facilities. Produced oil, gas and water are pumped back to the NAB via a subsea multiphase pipeline. The platform has facilities for drill cuttings re-injection and some produced water re-injection.

Ellon (a subsea oil development) and Grant (a subsea gas condensate development) are located around 9 km east of Dunbar and linked to the platform by flowlines and control umbilicals. Ellon started production in 1994 and Grant followed in 1998.

Elgin Franklin

# Central North Sea

TEPUK's Central North Sea (CNS) hub lies 240 km from the Aberdeen coastline in Blocks 22/25, 22/30, 29/5, 29/4 and comprises of the Elgin, Franklin, West Franklin, Culzean, and Ailsa sites.

### Elgin

Elgin consists of central processing facilities located on a Process, Utilities and Quarters (PUQ) platform bridge-linked to two wellhead platforms (WHP); Elgin WHP A and Elgin WHP B. The PUQ is, in effect, a miniature gas refinery with a sophisticated process plant onboard to produce commercial quality gas. Liquids from Elgin/Franklin are exported to Cruden Bay on the north east coast of Scotland via the Graben Area Export Line pipeline and Forties Pipeline System. Liquids are piped onwards to Kinneil for tanker export. Gas from Elgin/Franklin is exported to the Bacton terminal in Norfolk via the 468 km Shearwater Elgin Area Line pipeline. Production started in 2001.

# Franklin and West Franklin

Franklin WHP and West Franklin WHP are normally unattended satellite platforms that tie back to the Elgin PUQ. Franklin is a satellite field situated approximately 5.5 km south east of Elgin in Block 29/5b in a similar water depth. The West Franklin WHP lies approximately 6 km south east of Elgin PUQ.

The West Franklin field is an adjacent structure to the western margin of the Franklin field in the Central Graben area of the North Sea. The structure straddles blocks 29/4d and 29/5c and is an ultra HPHT field.





Culzean

## Culzean & Ailsa

The Culzean field is a developed via six production wells drilled by a heavy-duty jack-up drilling rig. The field facilities comprise of a WHP bridge-linked to a central processing facility (CPF) platform that is in turn bridge-linked to a utility and living quarters platform. The associated Ailsa Floating Storage and Offloading vessel (FSO) receives processed condensate from the CPF for onward tankerage. First production started in June 2019.



# Eastern North Sea

TEPUK's Eastern North Sea (ENS) was created from the assets acquired from Maersk Oil North Sea UK Limited in March 2018.

It includes the Gryphon Alpha and the Global Producer III (GP3) Floating Production, Storage and Offloading facilities (FPSO) and a number of fields: Gryphon, South Gryphon, Tullich, Maclure, Ballindalloch, Dumbarton, Lochranza and Balloch.

The Gryphon Alpha FPSO vessel is located in UKCS Block 9/18 approximately 169 km south east of Shetland and the GP3 FPSO vessel is in Block 15/20 located approximately 181 km from the east coast of Scotland.



# West of Shetland

The West of Shetland (WOS) operations (Figure 2) include the Laggan and Tormore fields and Edradour and Glenlivet fields.

The Laggan and Tormore fields are situated 125 km north west of the Shetland Islands approximately 600m below sea level and the Edradour and Glenlivet fields are situated approximately 70 km north west of the Shetland Islands at a depth of 300m – 430m.

Edradour and Glenlivet tie into the Laggan and Tormore pipelines. The Laggan and Tormore import pipelines are the longest subsea tie back in the UK. The co-mingled fluids are transported through these production pipelines to Shetland Gas Plant, which has a capacity of up to 15mscm/d gas and 35 kbbl/d condensate, for processing and export to St. Fergus Gas Terminal on the north east coast of Scotland via the Shetland Island Regional Gas Export pipeline, a 234 km long export pipeline which connects to the existing Frigg UK Area pipeline.

Edradour and Glenlivet pipelines were connected to the existing Laggan Tormore pipelines in 2017.



# **Drilling Operations**

TEPUK delivered an extensive exploration, development and well intervention programme in 2019 with drilling operations being completed successfully and safely across all TEPUK assets.

In the Central North Sea area, the Rowan Gorilla V (RGV) jack-up drilling rig was used to drill and complete the 7<sup>th</sup> development well (F12) from the Franklin Wellhead Platform. The RGV also commenced slot recovery operations in preparation for a future development well (F13).

The Maersk Highlander jack-up has been drilling on the Culzean field since 2016, continuing drilling operations throughout 2019.

The Noble Sam Hartley completed drilling of the B4 well, the 4<sup>th</sup> infill development well on Elgin Wellhead platform B. Drilling of the 30/12d-11 Isabella exploration well also commenced by the Noble Sam Hartley.

The drilling package on the North Alwyn A (NAA) platform was reactivated during 2018 after a period of being warm stacked with the drilling completed in August 2019 on the Alwyn N57 well.

Two wells were drilled in the West of Shetland area; the Laggan L5 well (from the Stena Don semisubmersible) and the Glendronach appraisal well (from the Ocean Valiant semi-submersible).

The Ocean Valiant also completed well plug and abandonment operations in the Northern North Sea area and completed drilling of a well in the Ballindalloch field (produced through the Gryphon A FPSO).

Rowan Gorilla V Jack Up Drilling Rig







# **Onshore Operations**

# Shetland Gas Plant

The Shetland Gas Plant (SGP) provides facilities for reception, processing and export of natural gas and its associated condensate from Laggan, Tormore, Edradour and Glenlivet gas condensate fields located to the West of Shetland (WOS).

SGP is located approximately 45 km North of Lerwick on the main island of the Shetland Isles.

Gas and condensate from the four WOS fields arrives at SGP through two flowlines, each 18" diameter, when the multiphase flow arrives at the plant, liquids are removed in the slug catchers before the gas is dried, chilled, re-heated and metered, before being sent via a 30" diameter Shetland Islands Regional Gas Export (SIRGE) pipeline to join with the existing 32" diameter Frigg UK (FUKA) pipeline system to the St Fergus Gas Terminal. Condensate is exported via a short pipeline to the neighbouring Sullom Voe Terminal (SVT).

Production started in 2016 and peak production rates were around 81kboe/d. This is regulated by the Scottish Environment Protection Agency (SEPA). Environmental performance data is not included for SGP in this report.

# Environmental Goals and Objectives

# Environmental Goals 2019 (Achieved)

	ASPECT	OBJECTIVES	TARGETS	PROGRAMMES	ACHIEVED
	Atmospheric Emissions	Reduce methane intensity of emissions from TEPUK operations	Methane intensity < 0.2% vol CH₄ / volume marketed gas GHG emissions	Determine agreed industry methodology for measurement and reporting of methane emissions	OGUK has developed a methodology framework for measurement and reporting of methane emissions
	Energy Management	Improve energy efficiency at TEPUK	ISO 50001:2018 certification for TEPUK	Carry out process required in order to gain accreditation	Process developed to achieve ISO5001:2018 certification. Certification achieved in April 2020
	Waste	Management of waste streams and reduce, reuse, and recycle	Improve waste management in all the assets	Review waste data from assets to identify areas for improvement	External waste audits were conducted on Gryphon and Alwyn assets and areas identified for improvement
	Environmental Management System	Ensure ISO 14001:2015 accreditation for TEPUK's	Incorporate Culzean & Ailsa into existing ISO 14001 Certificate	Carry out process required in order to gain accreditation	Culzean and Ailsa assets included in the ISO14001:2015 certification
	Environmental Improvement Programme	Increase environmental awareness among personnel	Ensure awareness of 85% personnel though Computer Based Training (CBT) sessions	Train personnel on environmental management, environmental awareness	Ongoing environmental awareness programmes are in place
		Improve management of environmental data	Digitalisation of environmental dashboard	Migrate/create environmental dashboards	Digitalization of environmental performance has been developed and communicated through out the business
	Chemical Management	Improve the management of chemicals at TEPUK	Define and implement the chemical management process	Finalise update of procedures, roll out implementation	An internal chemical management audit was conducted to identify process improvements throughout the lifecycle of the chemicals. Improvements are currently being rolled out and implemented



# Environmental Goals 2020 (Planned)

ASPECT	OBJECTIVES	TARGETS	PROGRAMMES
Energy Management System (EnMS)	Embed management system throughout the organisation	Achieve asset Energy Key Performance Indicators (EnPls) targets for 2020	Maintain EnMS to manage requirements of ISO50001:2018 certification
Atmospheric Emissions	Develop process for measuring Scope 1,2,3 Emissions ( $CO_2$ Equivalent)	Documented procedure for Scope 1-3 emissions calculations	Service Company & Stakeholder Engagement
Atmospheric Emissions	Assess Feasibility of Carbon Offsetting Project via Peatland Restoration	Identify and work collaboratively with stakeholders/ partners to develop project scope.	Develop business case for TEPUK.
Atmospheric Emissions	Asset models to be developed for emissions forecasting	Validation with historically verified data compilation of asset emissions forecast	E Forecaster tool to be beta user testing and asset models constructed
Atmospheric Emissions	Culzean & Ailsa New Entrant Reserve (NER) Applications completion	NER application compiled, verified & submitted	Assessment of capacity threshold - Monitoring of emissions for set period to be completed
Waste Management	Reduce waste to landfill	Identify and work collaboratively with waste management provider to develop project scope.	Zero waste to landfill
Environmental Improvement Programme	Improve management of environmental performance	Digitalisation of environmental performance data	Create Environment Performance App in PowerBi



# Environment and Energy Management System

TEPUK is certified to the international standard for environment management ISO 14001:2015 and energy management ISO 50001:2018 (achieved in April 2020).

The standards specify the requirements for establishing, implementing, maintaining and improving environment and energy management systems following a systematic approach to enhance and drive continual improvement throughout the organisation.

Consistent with our HSE policy the intended outcomes of the organisation's environment and energy management systems includes:

- Enhancement of environment and energy performance
- Fulfilment of compliance obligations
- Achievement of environment and energy management objectives

The scope of both ISO 14001:2015 and ISO 50001:2018 certification includes all TEPUK's operational assets and onshore support functions.







# Atmospheric Emissions

Atmospheric emissions are generated from several sources on our installations. The sources are detailed below and are required to support the processes related to exploration and production of hydrocarbons.

- Combustion of fuels (gaseous and liquid) in turbines and generators that are used for power generation and compression;
- Flaring, which is an integral part of the installation safety systems;
- Venting of both hydrocarbon and inert gases from the process plant; and
- Venting of sour gas which is removed from the product to ensure pipeline entry specification is achieved.

Fuel Consumption

Flaring

Gas Venting



Figure 3: CO<sub>2</sub> equivalent emissions (tonnes) from TEPUK operating facilities between 2016-2019

Trading System scheme (EUETS), this data is independently verified. All atmospheric emissions, from both combusted and vented sources for all TEPUK activities are required to be reported to BEIS via EEMS on an annual basis.

To help us understand our overall impact on climate change from our activities, we measure the

amount of emissions to the atmosphere and then

convert this data into a carbon dioxide equivalent

(CO<sub>2</sub>e). Figure 3 illustrates the CO<sub>2</sub>e emissions to atmosphere from all TEPUK activities over the last

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Direct Process Emissions

### Atmospheric Emissions contd.

The atmospheric legislation applicable to the UK aims to achieve a reduction in greenhouse gas emissions.

TEPUK has developed an ambitious carbon management strategy to reduce its greenhouse gas emissions in support of the legislation and the Net Zero strategy set by the UK Government in 2019. The TEPUK strategy includes reduction through operational optimisation, digitalisation, introduction of new technologies and implementation of alternative power sources (e.g. power from onshore or offshore renewables). This strategy will be developed in line with the standard Energy Management System ISO 50001:2018.

A number of reduction projects were implemented in 2019 including the move to single export pump operations on Elgin (estimated savings of 13,400t  $CO_2$  per year), review and implementation of flare philosophies across the fleet TEPUK also initiated a digitalisation project for intelligent real time emissions monitoring.

TEPUK is not only focusing on its direct emissions (scope 1) but also working closely with service providers to reduce the emissions from supplied services (scope 2). In 2019, a review of the waste management logistics was undertaken which resulted in changes to waste transfer routes thus reducing mileage and associated emissions.

In order to make the step changes required for the longer-term reductions, TEPUK has taken a collaborative approach, through engagement with specialist service companies, trade body organisations and partners. By working in this way, ideas and good practice can be shared enabling the Net Zero ambition to become more achievable for the oil and gas industry within the UKCS.



**Figure 4:**  $CO_2$  equivalent emissions (tonnes) from each TEPUK operating facility in 2019

Emissions in 2019 have increased compared to 2018, this is as a result of a full years data from previous acquisitions (GP3 and Gryphon) and the start-up of Culzean and Ailsa (Figure 4).



# Permitted Discharges

### Oil in Produced Water

Produced water is extracted from the subsurface with oil and gas which after processing contains trace amounts of oil.

The produced water is either re-injected into the wells or discharged to sea in accordance with the environmental permit regulated under The Offshore Petroleum Activities (Oil Pollution Prevention and Control) Regulations 2005.

Figure 5 illustrates the total quantity of produced water discharged to sea and the average oil in water content for the last four years. The produced water volumes increased in 2019 in comparison with the previous years due to a full year of operations from previously acquired assets (GP3 and Gryphon) which had larger discharges of produced water compared to other assets in the TEPUK portfolio. Re-injection rates at these fields are optimised to limit the discharge and processes are in place to manage the stability of the separation units on each asset. The start-up of Culzean and Ailsa assets in July 2019 also contributed to the increase in produced water. The average oil in water content decreased in 2019 compared to 2018.



*Figure 5:* Total quantity of produced water discharged to sea and the average oil in water content from TEPUK operating facilities between 2016-2019

Total Quantity of Producto Water Discharged ---- Average Oil in Water Concentration



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*Figure 6:* Total quantity of produced water discharged to sea and the average oil in water content from each TEPUK operating facility in 2019

Producted Water Discharged — Oil in Water Concentration

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### Oil in Produced Water contd.

Figure 6 shows that the Alwyn asset had the highest average oil in water concentration for 2019 compared to the other assets, this was due to the unplanned discharge of produced water to sea with an oil content >30mg/l (permitted limit) during well management operations. However, the quantity of produced water discharged to sea was the lowest compared to the other assets therefore contributing the least volume of oil discharged as Alwyn primarily re-injects produced water back into the reservoir.

All other assets had an average of <30mg/l average oil in water content of the produced water that was discharged for each facility during 2019.



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### Chemical use and discharge

TEPUK use and discharge chemicals as part of the offshore exploration and production process.

The use and discharge of chemicals is regulated under the Offshore Chemicals Regulations 2002 (as amended).

OSPAR recommendation 2006/3 was enabled in the UK by the issue of the 'UK National Plan for the Phase out of Substances Identified as Candidates for Substitution'. This plan requires TEPUK to ensure arrangements are in place to support the achievement of the goal of zero discharges by 2020.

TEPUK carried on with the development and implementation of our Environmental Chemicals Management Strategy and successfully changed out several of its chemical applications for more acceptable substitutes. This strategy outlines the process TEPUK has in place to take into account the UK National Plan and the environmental impacts associated with chemical use and discharge. The use of this process enables TEPUK to prioritise the elimination of harmful substances with less harmful alternatives over a given time period.

Figure 7 shows that there was an increase in the production chemicals used and discharged from previous years from TEPUK's operating facilities, this was due to a full years data from previous acquisitions (GP3 and Gryphon) and the commissioning and start-up of Culzean and Ailsa assets.





*Figure 7:* Total production chemicals used and discharged (t) for TEPUK operating facilities between 2016-2019

Chemical used Chemical discharged

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### Chemical use and discharge contd.



As shown in Figure 9 below, approximately 30,000 tonnes of chemicals were used as part of the TEPUK's drilling and well intervention operations in 2019 with approximately 4,500 tonnes discharged in accordance with the environment permits. The majority of the chemicals (71.4%) were completion brines and water-based mud chemicals which have little or no risk to the environment (PLONOR) as classified by OSPAR.

**Figure 8:** Total chemicals used and discharged (t) for each TEPUK operating facility for 2019

In 2019, a significant proportion of chemical use primarily relates to the additive used in water injection systems as part of microbiological control, corrosion treatment and the management of hydrogen sulphide on the Alwyn asset (Figure 8 above).

Chemical discharged

Chemical used



Figure 9: Total Well chemicals use and discharge (t) for TEPUK operating facilities for 2019

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### ENVIRONMENTA PERFORMANCE

# Releases to the Environment

One of TEPUK's key focus areas is reducing spills to the environment from our activity in the North Sea.

Unpermitted releases of oil and chemicals, regardless of volumes, are recorded and investigated internally and reported to the regulator.

Table 1 shows that in 2019, there were a total of forty-six unplanned releases to sea with twenty-six oil related and 20 chemical losses amounting to a total mass of 19.40 tonnes. The largest release totalled 15.73 tonnes of oil related to a long-term release from the Jura 1 subsea wellhead. A permanent containment device was installed in November 2019 and complete containment of the release has successfully been achieved.

There was an additional release greater than two tonnes from the Gryphon asset where 2.2 tonnes of hydraulic fluid was released from a subsea control system.

YEAR	NUMBER OF OIL SPILLS	MASS (T)	NUMBER OF CHEMICAL SPILLS	MASS (T)
2016	29	0.24	15	0.734
2017	35	3.94	10	4.3
2018	41	9.73	12	5.6
2019	26	15.80	20	3.6

**Table 1:** Total number and mass (tonnes) of oil and chemical unplanned releases to sea from TEPUK activities between 2016-2019



# Waste Management

TEPUK's operations consume materials that generate special and non-special waste. Waste is managed from 'cradle to grave' following company procedures and applicable legal requirements.

As part of TEPUK's Environment Improvement plan, waste management initiatives have been identified and developed such as reducing waste volumes at the source and minimising the waste that goes to landfill in accordance with the waste hierarchy.

In 2019, the amount of waste (special and non-special) that we generated from our operational activities increased from previous years due to a full year of operations from previously acquired assets (Gryphon and GP3) and also the commissioning and start-up of Culzean and Ailsa assets (Figure 10).



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Figure 10: Mass (tonnes) of special and non-special waste generated by TEPUK's operating facilities between 2016-2019

Special waste Non special waste



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### Waste Management contd.

Special waste includes paints, contaminated drums and containers, oily waste, chemicals, and aerosols. Quantities of special waste generated by our operating facilities and the disposal routes used are shown in Figure 11. Culzean and Ailsa had increased quantities of special waste compared to the other assets due to commissioning and start-up work, the majority of which was treated and recycled.

Non-special waste includes segregated recyclables (plastics, wood, paper, cardboard) and general waste (e.g. textiles, some galley waste) and scrap metal. As shown in Figure 12 Culzean and Ailsa; and Alwyn and Dunbar assets had increased quantities of non-special waste due to commissioning and start-up work and platform drilling operations, respectively.



Figure 11: Mass (tonnes) of special waste generated by each TEPUK operating facility in 2019 and the disposal routes used





Figure 12: Mass (tonnes) of non-special waste generated by each TEPUK operating facility in 2019 and the disposal routes used

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### Waste Management contd.

Figures 13 and 14 show the special and non-special waste generated from TEPUK's Mobile Offshore Drilling Units (MODUs) utilised in 2019 and the associated disposal routes. These quantities include drilling mud and cuttings. TEPUK are working with our waste management providers to develop initiatives to reduce the drilling waste that goes to landfill.



*Figure 13:* Mass (tonnes) of special waste generated by TEPUK's MODUs in 2019 and the disposal routes used



Figure 14: Mass (tonnes) of non-special waste generated by TEPUK's MODUs in 2019 and the disposal routes used



Table 2 shows the drill cuttings generated between 2016 and 2019 by our operations which were managed offshore and discharged to the marine environment under permit or re-injected into the reservoir. This is industry Best Available Technique (BAT) for the management of these waste types.

	2016	2017	2018	2019
Water Based Drill Cuttings discharged overboard (tonnes)	3,673	1,647	2,204	6,692
Oil Based Drill Cuttings treated and discharged overboard (tonnes)	2,776	2,164	1,129	4,472
Cuttings, slurry, brine and slops re-injected (tonnes)	1,156	0	0	758

Table 2: Drill cuttings discharged offshore between 2016-2019



TEPUK is committed to continuous environmental improvement

If you have any comments or would like further information on our environment or energy management please contact: **Public Affairs and Corporate Communications** 

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