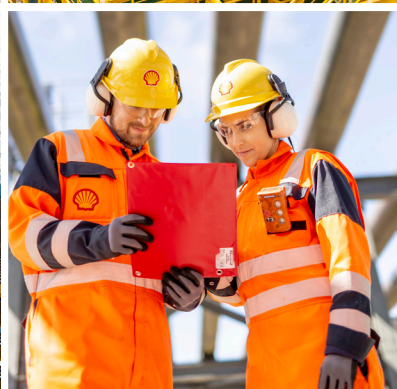


2018



**ANNUAL
ENVIRONMENTAL
STATEMENT** for
Shell U.K. Limited Upstream



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This report has been produced in order to meet the requirements of OSPAR Recommendation 2003/5, as advised by the U.K. Government Department of Business, Energy and Industrial Strategy (BEIS), formerly known as Department of Energy and Climate Change (DECC).

Where the words "Shell", "we", "us" and "our" are used in this report they refer specifically to Shell UK Upstream business. "Our facilities" or "our installations" refers to facilities or installations which we are appointed to operate on behalf of co-venturers which own the facilities or installations jointly.

The companies in which Royal Dutch Shell plc directly and indirectly owns investments are separate legal entities.

In this report the expressions "Royal Dutch Shell" and "Shell group" are sometimes used for convenience where references are made to Royal Dutch Shell plc and its subsidiaries in general.

INTRODUCTION

Shell U.K. Limited (Shell UK) has been a leading player in the North Sea for over 50 years. In 2018, Shell UK produced oil and gas from more than 50 interests in North Sea Fields from 30 North Sea platforms and two Floating Production Storage and Offloading (FPSO) vessels. We produce approximately 10% of the UK's oil and gas. Onshore, we operate three gas plants (located at Bacton, St Fergus and Mossmorran) and pipeline systems that were responsible for delivering more than 20% of the UK's gas supply.

In 2018 Shell UK marked 50 years of production in the North Sea which all began when the first production from the Southern North Sea (SNS) Leman Field started to the Bacton onshore plant back in August 1968.

This report is the 2018 annual environmental statement for Shell UK's upstream operations which contains the environmental performance of Shell's upstream operated facilities in the UK, both offshore and onshore. The data used in this report has been previously reported to the UK environmental regulators via the Environmental Emissions Monitoring System (EEMS), for offshore operations (BEIS), and the Pollutant Release Inventory and Pollution Inventory for onshore operations in Scotland (SEPA) and England (EA) respectively.

TERMINOLOGY USED IN THIS STATEMENT

"Installations" refers to:

- Shell UK operated oil and gas production platforms and FPSOs offshore;
- Shell UK operated gas processing plants onshore; and,
- Third party mobile drilling rigs in the UK whilst on contract to Shell in UK waters.

"Facilities" refers to operating installations covering the above and also includes wells, subsea infrastructure and onshore pipeline systems.

"Functions" refers to services required to facilitate and support the UK business including facility operations (e.g. wells, production, engineering, health, safety, security, environment and social performance management, technical and process assurance, project and development planning, logistics (vessels and helicopters), production and well fluids chemistry, laboratory services, finance, legal, contracts & procurement and office management.

Additional acronyms and abbreviations used in the text are described in Appendix 3.



WHAT WE DO

In 2018, upstream offshore and onshore activities operated by Shell in the UK Continental Shelf (UKCS) included:

- **Shearwater:** a high pressure, high temperature gas/condensate reservoir produced from an integrated process, utilities and quarters platform bridge linked to a wellhead platform.
- **The Shearwater-Elgin Area Line (SEAL):** a pipeline that transports sales quality gas from the Shearwater and Elgin-Franklin platforms to the Bacton Gas Terminal on the Norfolk coast.
- **Nelson:** a drilling and production platform with subsea satellites tied back to the platform. The Nelson cluster consists of the Nelson field and the Howe and Bardolino fields via subsea tie-backs.
- **Gannet:** a fixed drilling and production platform which processes oil and gas from the Gannet A, B, C, D, E, F and G fields via subsea wellhead tie-backs.
- **Curlew:** producing reservoirs tied back to the Curlew FPSO via subsea wells based around three drilling centres. Curlew production ceased at end of March 2019 and the facilities are being prepared for decommissioning.
- **Pierce:** an FPSO (the Haewene Brim) producing, storing and offloading crude oil from the Pierce North and South fields. Bluewater Energy Services is the duty holder for this facility.
- **The Brent field:** four facilities, Brents Alpha, Bravo, Charlie and Delta. Brent Delta ceased production at the end of 2011 and the platform topsides were removed and shipped to shore for dismantling in May 2017. Production ceased at Brents Alpha and Bravo in late 2014 and are both being prepared for decommissioning. Brent Charlie is still in production, including producing hydrocarbons from the nearby Penguins field.
- **Goldeneye:** a Normally Unattended Installation (NUI) controlled from an Installation Control Centre based at the St Fergus Gas Plant. The Goldeneye field ceased production in 2011 and is being prepared for decommissioning.
- **Clipper:** a Normally Attended Installation (NAI) comprising six fixed bridge linked platforms in the Southern part of the UK sector of the North Sea in the Sole Pit field. The Clipper installation produces and processes natural gas from its own wells and imports and processes gas from Barque PB & PL, Galleon PN & PG, Skiff, Carrack, Carrack East and Cutter fields.
- **Leman:** a NAI in the Southern part of the UK sector of the North Sea comprising five bridge linked platforms. The Leman Alpha installation produces and processes natural gas from its own wells. It imports and processes gas from the remainder of the Leman field platforms, Leman Bravo, Leman BT, Leman Charlie, Leman Delta, Leman Echo, Leman Foxtrot, Leman Golf, and imports natural gas and liquids from Corvette, Brigantine BG & BR, Caravel and Shamrock.
- **St Fergus Gas Plant:** a terminal in North East Scotland that processes wet gas received from the FLAGS (Far North Liquids and Associated Gas System) pipeline and Fulmar gas line from multiple North Sea fields. Products include natural gas that is transferred into the UK grid's National Transmission System and Natural Gas Liquids (NGL) that are piped south to Shell UK's fractionation plant in Fife, Scotland (Fife NGL).
- **Fife NGL:** a fractionation plant where NGL received from the St Fergus Gas Plant are separated by distillation into ethane, propane, butane and natural gasoline. The ethane is piped to ExxonMobil's adjacent Fife Ethylene Plant (FEP) as feedstock, the remaining products are transported via pipeline to the Shell UK operated marine terminal at Braefoot Bay on the Firth of Forth for loading onto ships for export. Some products are also exported from the plant by road tanker.
- **Bacton:** a gas reception and processing facility located on the Norfolk coast which processes gas from the Sole Pit, Leman, SEAL, BBL and Sean pipelines. Processed gas is transferred to the national grid via the adjacent Transco transmission facilities.

For more information on Shell UK, visit our website at www.shell.co.uk/about-us/what-we-do

OUR ENVIRONMENTAL GOALS AND OBJECTIVES

Shell is committed to protecting the environment and applies a set of global environmental standards to all of our activities. We aim to make a positive contribution where we operate and seek to avoid, and where not possible, to minimise any negative impact. We carefully consider the potential impact Shell may have on the environment and the communities we share it with during the planning of projects and throughout the lifetime of operations.

Shell's commitment and policy on Health, Safety, Security, Environment and Social Performance (HSSE & SP) is included on page 7. Our Health, Safety, Security and Environment (HSSE) Management System in the UK drives continuous improvement in our approach to environmental risk management and performance. The processes and procedures we follow, and resources deployed, are designed to comply with the Shell Group's global standards and environmental regulations, with a focus on managing impacts and preparing for future challenges and opportunities. Our management system is certified to ISO 14001 (the internationally accepted environmental management standard). The system covers all of our upstream activities and locations in the UK and UK waters involved in exploration and production, as well as the processing of oil and gas.

Continuous improvement in our environmental performance focuses on the following objectives:

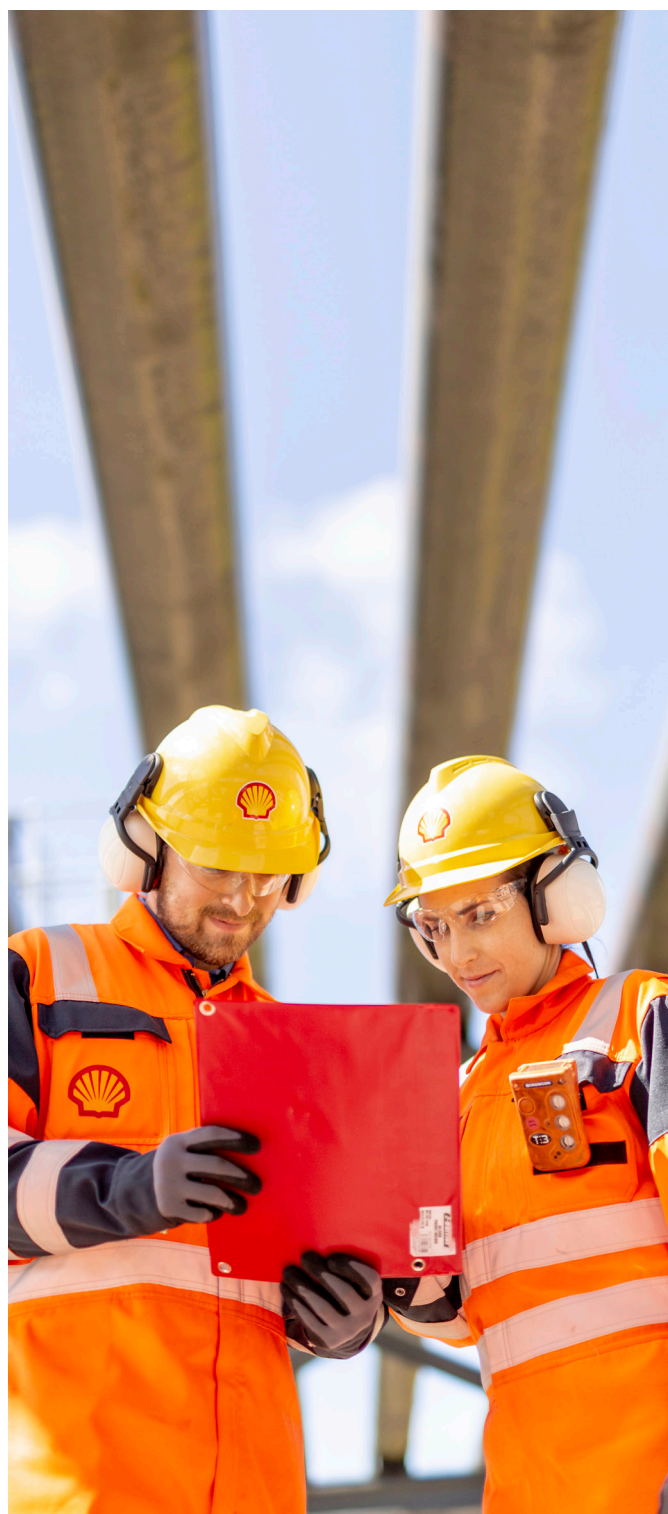
- Environmental risk management for all our activities throughout the life cycle of a project to avoid or minimise any impact on the environment;
- Using materials and energy efficiently to provide our products and services;
- Setting targets for improvement;
- Monitoring performance;
- Playing a leading role in promoting best practice in our industry; and,
- Engaging effectively with stakeholders.

These objectives are translated into relevant programmes that aim to drive continual improvement in our UK upstream operations. In addition to the day to day support to new projects and our operated facilities, including routine support and monitoring of the delivery of compliance with Shell standards and UK regulations, the main focus areas in 2018 related to environmental performance in the UK sector of our business included:

- Continued focus on opportunities to reduce greenhouse gas (GHG) emissions from our operations through energy use optimisation and the reduction of flaring and venting.
- Further enhancement of the fugitive emissions management procedures at the onshore plants.
- Optimisation opportunities for emissions from the cold vent at the St Fergus Plant.
- Finalisation of the environmental impact assessment programmes for the development projects Fram and Arran.
- Finalisation of the environmental impact assessment to support the decommissioning programme for the Curlew facility.
- Ongoing consultation on the overall decommissioning programme for the Brents field.
- A phased deployment of the EmTrax application to our offshore facilities in support of the simplification and automation of the reporting of our chemical use data to the Regulator.
- Updates to the environmental management system to the ISO 14001:2015 standard.

Environmental improvement programmes and achievements in 2018 included:

- Preparation of an updated GHG and Energy Management Plan, including individual facility specific targets and GHG reduction initiatives with further optimisation of our use of energy.
- Delivery of three GHG reduction projects at our offshore facilities, reducing approximately 10,000 tonnes of GHG emissions from our routine offshore operations.
- Additional GHG reduction measures, including fuel use reduction measures identified at Shell operated facilities. The opportunities identified have been approved for delivery.
- Cold vent emissions reduction opportunities identified at the St Fergus Plant and approvals in place for implementation.
- Consolidation of the leak detection and repair processes at the onshore plants and quantification of methane reductions realised.
- Introduction and deployment of EmTrax tool for production chemicals tracking and reporting at two of the four operated platforms in the Central North Sea. Deployment at remaining platforms scheduled for 2019.
- Achieved internal approval from Shell and external approval from the Regulator of the environmental statements for the Fram and Arran development projects in support of a positive final investment decision.
- Achieved internal approval from Shell and external approval from the Regulator for the environmental statement in support of the Curlew facility decommissioning programme.
- Conducted 10 marine environmental baseline and/or monitoring surveys in support of project assessments and/or operational monitoring around offshore assets.
- Successful re-certification of the asset wide environmental management system to the most recent international standard ISO14001:2015.
- Confirmed Shell financial and technical support for Phase 2 of the INSITE Programme (Influence of man-made Structures in the Ecosystem) which we have supported through Phase 1 since the programme outset in 2012. The programme was conceived to support independent science leading to a greater understanding of the influence of man-made structures on the North Sea ecosystem. The focus for Phase 2 is on three elements; a data initiative, a science programme and a technology programme.



SHELL COMMITMENT AND POLICY ON HEALTH, SECURITY, SAFETY, THE ENVIRONMENT AND SOCIAL PERFORMANCE

COMMITMENT

In Shell we are all committed to:

- Pursue the goal of no harm to people;
- Protect the environment;
- Use material and energy efficiently to provide our products and services;
- Respect our neighbours and contribute to the societies in which we operate;
- Develop energy resources, products and services consistent with these aims;
- Publicly report on our performance;
- Play a leading role in promoting best practice in our industries;
- Manage HSSE & SP matters as any other critical business activity; and
- Promote a culture in which all Shell employees share this commitment.

In this way we aim to have an HSSE & SP performance we can be proud of, to earn the confidence of customers, shareholders and society at large, to be a good neighbour and to contribute to sustainable development.

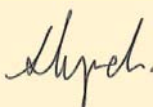
POLICY

Every Shell Company:

- Has a systematic approach to HSSE & SP management designed to ensure compliance with the law and to achieve continuous performance improvement;
- Sets targets for improvement and measures, appraises and reports performance;
- Requires contractors to manage HSSE & SP in line with this policy;
- Requires joint ventures under its operational control to apply this policy, and uses its influence to promote it in its other ventures;
- Engages effectively with neighbours and impacted communities; and
- Includes HSSE & SP performance in the appraisal of staff and rewards accordingly.



Ben van Beurden
Chief Executive Officer



Sinead Lynch
UK Country Chair

Originally published in March 1997 and updated by the Executive Committee December 2009.

General Disclaimer: The companies in which Royal Dutch Shell plc directly and indirectly owns investments are separate entities. In this Policy the expression "Shell" is sometimes used for convenience where references are made to companies within the Shell group or to the group in general. Likewise, the words "we", "us" and "our" are also used to refer to Shell companies in general or those who work for them. These expressions are also used where no useful purpose is served by identifying specific companies.



ENVIRONMENTAL PERFORMANCE

EMISSIONS AND DISCHARGES

Greenhouse Gas Emissions

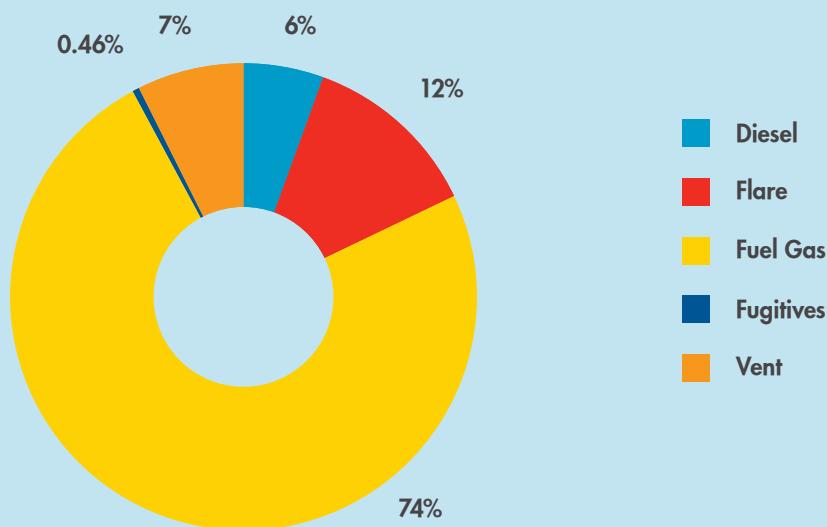
Greenhouse gas (GHG) emissions management is central to Shell’s operations with a clear focus on controlling and reducing our GHG footprint. We continue to seek opportunities across the company to reduce our emissions across our portfolio of activities and report our global emissions publicly in line with accepted standards.

The principal source of GHG emissions from Shell UK operations is through the combustion of fuels to drive power generation turbines, gas compression facilities and pumps amongst other services in the daily operation of our facilities. Other sources are from the flaring and venting of gas which, on occasion, is required for safety reasons, as well as some additional emissions from the combustion of diesel in the engines on mobile drilling rigs and in diesel generators used as power back-up at our facilities. Sources of GHG emissions from our operations in 2018 are summarised below with the proportions of the total from each main source illustrated in **Figure 1**.



Figure 1: GHG Emissions by source in 2018*

**(based on 100% of emissions at all assets in UK waters where Shell is the operator including well operations)*



Main sources of GHG emissions from Shell UK activities:

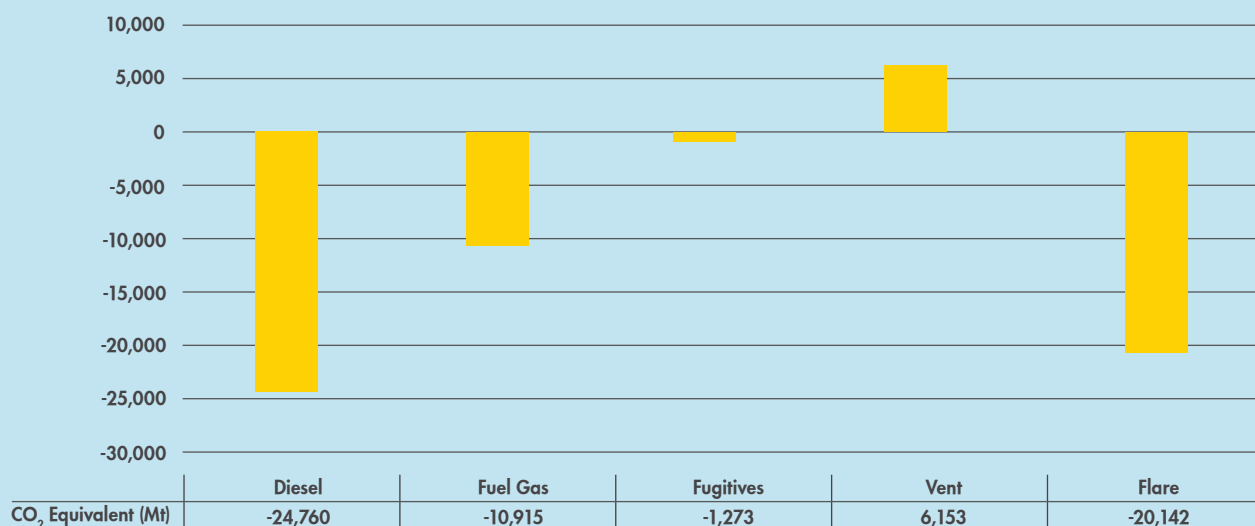
1. Combustion of fuel gas for power generation, compression drives, heaters, pumps and engines. **Figure 1** shows that in 2018 emissions from the combustion of fuel gas is the largest contributor to the GHG emissions from our UK upstream operations, at around 74% of the total.
2. Emissions from the combustion of diesel, largely used in back-up generators and on mobile drilling units, amounted to 6% of the total.
3. Flaring emissions include emissions from the flaring of gas from relief valves, the flare pilot lights and the safe disposal of gas in systems to be blown down to support routine maintenance activities, stabilise production when bringing new wells on-line, in the event of process upsets through equipment and plant trips, to support routine maintenance activities, to stabilise production when bringing new wells on-line, and during shut-down and start-up activities. In 2018, GHG emissions from flaring at Shell UK upstream operated facilities amounted to 12% of total GHG emissions.
4. Some of our installations are designed to vent gas for safety reasons, including at our unmanned gas platforms in the southern North Sea and the gas processing plant at St Fergus. GHG emissions from venting amounted to approximately 7% of our total in 2018.
5. GHG emissions through small fugitive losses, mainly from equipment and pipework connections amounted to 0.46% of the total in 2018.

Direct greenhouse gas (GHG) emissions from Shell UK operations in 2018 totaled 2.22 million tonnes of CO₂ equivalent (CO₂e), a reduction of 350 thousand tonnes or 15% of the total of 2.57 million tonnes emitted in 2017. Much of this reduction in 2018, was due to the divestment of the Armada, Everest and Lomond facilities in November 2017.

Figure 2 illustrates total GHG emission changes by source since 2017 at the remaining Shell UK operated facilities and shows a reduction in GHG emissions since 2017 from flaring, fuel gas combustion, diesel combustion and fugitive losses but an increase in venting emissions. Total net reduction in emissions of GHG in 2018 Shell UK operated facilities amounted to 51 thousand tonnes, representing a 2.3% reduction relative to the 2018 total. Key reductions were made at the following facilities:

- **Fuel Gas:** a net reduction in GHG emissions from fuel gas combustion of 11,000 tonnes since 2017 with fuel gas use reducing at the St Fergus and FNGL plants in particular due to adjustments to the operational modes.
- **Diesel:** a net reduction in emissions from diesel combustion of 25,000 tonnes since 2017. This was principally due to reduced diesel combustion at Pierce as there was greater availability of the fuel gas system at the facility in 2018. In addition reduced mobile rig activity also reduced diesel requirements in 2018.

Figure 2: GHG emissions 2018 performance relative to 2017

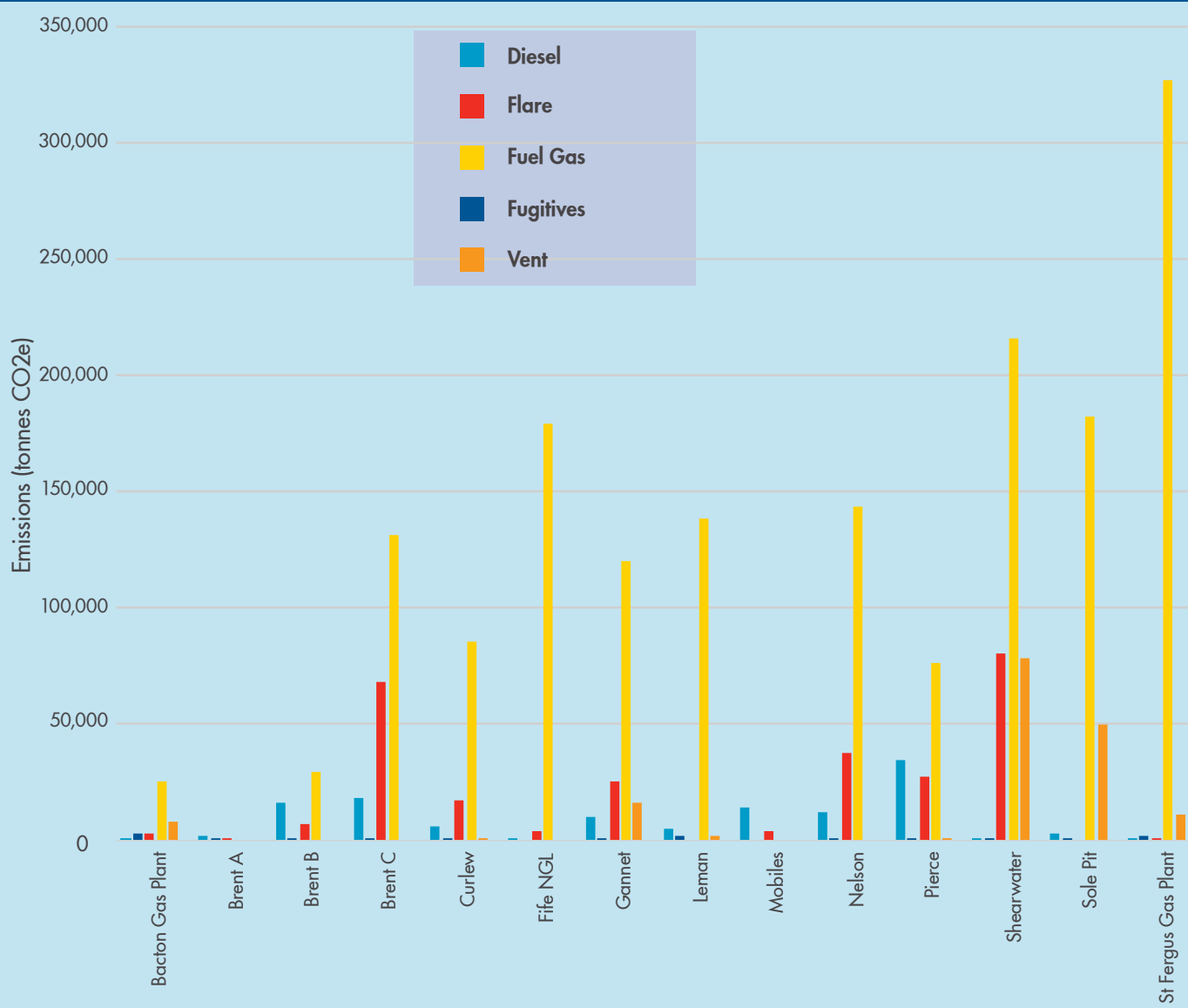


- **Flaring:** a net reduction in emissions of 20,000 tonnes since 2017 with key reductions at Pierce due to an increased availability of the gas re-injection system and at Shearwater, although this led to an increase in venting.
- **Venting:** emissions through increased venting in 2018 was mainly due to the inability to ignite the low pressure flare stack at the Shearwater facility for a period of time in 2018. The high CO₂ content from the wells made the gas in the LP system inflammable. This was remedied in August.
- **Fugitives:** the small net reduction in low level losses of methane measured (1,300 tonnes) was mainly due to improved reliability at the Clipper facility.

Additional focus was placed on reducing fugitive losses (small losses of methane from equipment and flanges) in 2018. Maintenance programmes have been enhanced using Optical Gas Imaging (OGI) utilising Forward Looking Infrared (FLIR) cameras to quickly identify any losses of gas, with the information feeding into 'find and repair' programmes. By embedding these enhanced processes, losses can be easily identified and the time between a loss first occurring and the repair being completed can be greatly reduced.

Figure 3 shows the total GHG emissions by source at each facility operated by Shell UK upstream in 2018. The St Fergus plant remains the highest individual contributor of GHG emissions and is a reflection of the considerable energy required to process the scale of the gas throughput. The plant is, however, a low emissions simple gas separation facility and emissions intensity (proportion of emissions per unit of gas processed) is very low and well within the high performance industry benchmark for this type of facility.

Figure 3: GHG emissions by source per facility in 2018 (tonnes CO₂e)



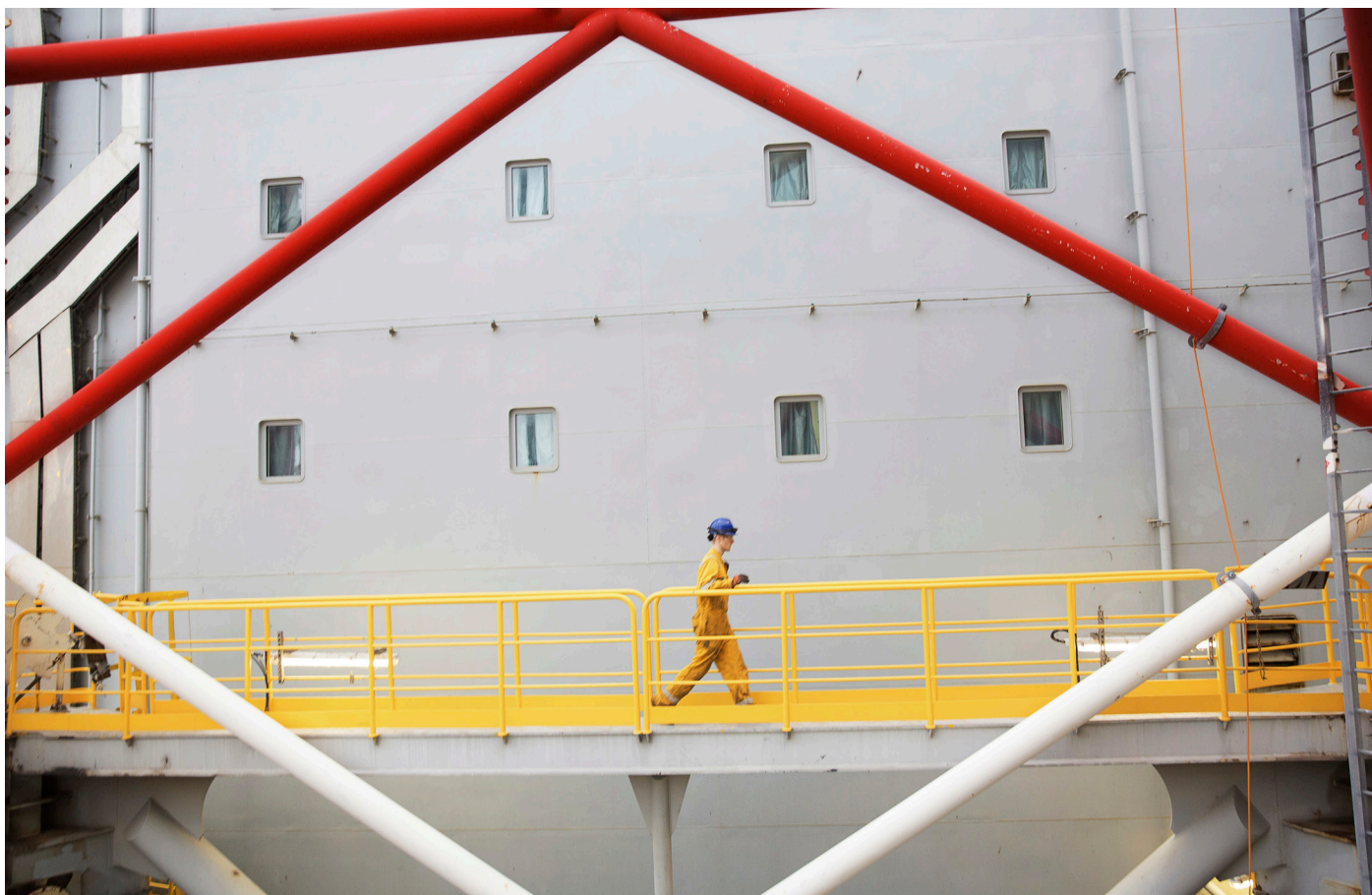
ENERGY USE AND RESOURCE MANAGEMENT

Improving the energy efficiency of the facilities we operate is one of the ways we manage our emissions and Shell UK continuously seeks to identify opportunities to optimise the efficient use of energy at our operational sites. Stability of production at our facilities is a key factor in improving energy efficiency and, as such, we continued with initiatives in 2018 to improve the reliability of the equipment on our installations and enhance our maintenance activities to increase system availability.

In addition, in 2018, opportunities to abate emissions were implemented in line with our emissions abatement schedule. Three opportunities delivered a reduction of approximately 10,000 tonnes of GHG from our emissions. These projects included:

- Reduction of the flare gas purge rate at Brent Charlie.
- Reduction of the fuel gas pressure on Pierce improving the energy efficiency of the gas used.
- Rescheduling the annual re-compressor service on Pierce to a planned shutdown to avoid flaring that would otherwise have been required.

Identifying new opportunities is an ongoing process and further energy use analysis is planned across all of Shell UK upstream installations during 2019 to provide improvement opportunities to feed into our abatement programme.



OIL IN PRODUCED WATER

In 2006, OSPAR set a reduction target in total oil in produced water quantities of 15% below levels discharged to sea in 2000. These recommendations are regulated in the UK through the Offshore Petroleum Activities (Oil Pollution Prevention and Control) Regulations 2005 (as amended).

The water produced with oil and gas at our offshore facilities during our production operations was treated to meet permitted levels of effluent quality before discharge to sea. **Figure 4** shows the amount of residual oil (in tonnes) discharged to sea in produced water from each of our operated facilities in 2018. The total amount of residual oil discharged from Shell UK facilities increased in 2018 (242 tonnes) compared to 2017 (214 tonnes). The amounts discharged were all within the volumes capped by the Regulator at each facility.

- An average level of 37 ppm for the month of May at our Gannet facility. This was due to unsatisfactory treatment system performance at the beginning of the month during some process upsets. The situation was quickly remedied through corrective maintenance.
- An average level of 35 ppm for the month of June at our Nelson facility due to reduced separation efficiency in the water treatment system caused by elevated sand content which was quickly remedied.
- Three separate occasions of exceedance above the 30 ppm monthly average were experienced at our Shearwater facility in February (35 ppm), April (33 ppm) and May (32 ppm). Due to the nature of the lightness of the oil produced with water in this gas field, the Shearwater facility has experienced intermittent issues, during production, in average concentrations of residual oil in produced water above the limit of 30 ppm monthly average. Nevertheless, although the total amount of oil entering the sea was relatively small (see **Figure 4**) at Shearwater, detailed design is underway on an upgraded water treatment system for the facility. This is expected to improve water handling and effluent quality. Through this project, the existing system will be modified and upgraded with additional equipment. Upgrade and installation of the new system will require a complete shutdown of the facility which is due at the next turnaround scheduled in 2020.

Figure 4: Total volume of produced water and mass of oil discharged to sea from each Shell operated offshore installation in 2018

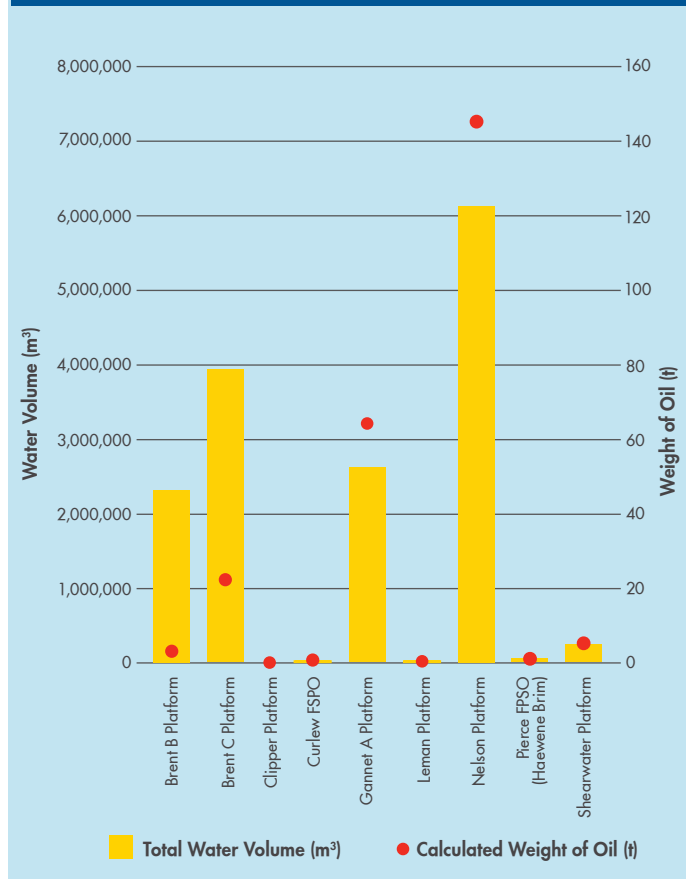
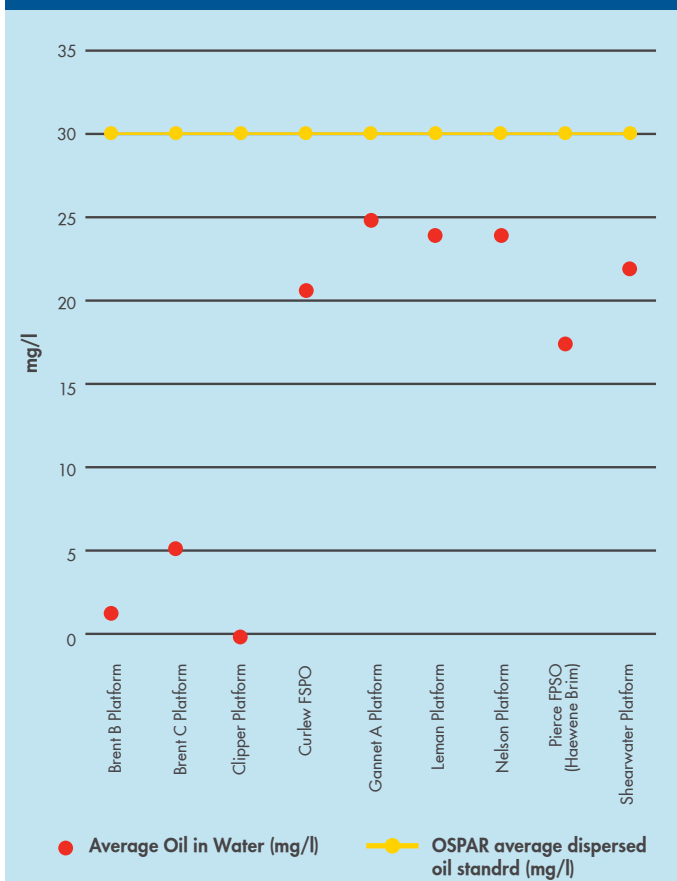


Figure 5: Annual average dispersed oil concentrations in produced water from Shell operated offshore installations in 2018



Annual average concentrations of residual oil in produced water discharges at each facility in 2018 are presented in **Figure 5**. Residual oil in produced water concentrations were monitored regularly at each facility and any exceedance of the regulatory monthly average limit of 30 milligrams of oil per litre (parts per million or ppm) was reported to the Regulator. Each facility was within the 30 ppm average for the year and was typically in compliance with the 30 ppm monthly in 2018, although five separate non-compliances were recorded:

UNPLANNED RELEASES

Spill reduction is an area of focus for all our activities and we have clear requirements and procedures in place in order to prevent unplanned releases of any materials to the environment. We have secondary containment around all tanks and equipment that contain oils or chemicals and routine maintenance programmes were implemented to improve the integrity and reliability of all equipment used in the production, processing or transfer of liquid materials. However, spills can still occur for reasons such as operational upsets, minor equipment failures subsea, unusual corrosion or human error.

Unplanned releases of oil and chemicals during day to day activities at Shell's operated installations in the UK, regardless of volume, are recorded internally and reported to the offshore environmental Regulator. Releases to the sea, whether during facility operations and maintenance, including subsea releases, or during well or vessel activities are reported individually to the Regulator at the time of the release using a Petroleum Operations Notice (PON1). The Regulator publishes an annual list of PON1s reported for all operators in the North Sea.

Table 1 presents the total number and mass of unplanned releases to the sea during Shell activities in the North Sea over the last five years. In 2018, a total of 42 unplanned releases to sea of oil and chemicals from our operations were recorded and reported, the lowest number recorded in the last five years. The total mass lost in 2018 amounted to 1.9 tonnes, again the lowest in the last five years and considerably lower than the total amount of 56 tonnes reported in 2017.

Of the 42 unplanned releases in 2018, 28 were oil related and 14 were chemical losses. The majority of these releases were very small with 23 of the 42 being below 10 kg (< 0.01 tonne), and 13 estimated to be between 10-100 kg in mass. The remaining six releases were individually estimated to be greater than 100 kg (0.1 tonne), ranging from 0.14 and 0.39 tonnes and totaled approximately 1.55 tonnes (81.5%) of the total amount for 2018 (1.9 tonnes).

	2014	2015	2016	2017	2018
Number of Oil & Chemical Spills (includes spills <100kg)	87	64	59	53	42
Mass of Oil & Chemical Spills (tonnes)	12	20	27	56	1.9

Table 1: Number and mass of spills to sea (2014-2018)

CHEMICAL MANAGEMENT

Production Chemicals

The type and volume of production chemicals used in our operations varied across our facilities depending on their requirements. Production chemicals use was affected by various factors. Key factors include:

- Use of more efficient chemicals that reduce amounts and concentrations required;
- Improved knowledge of chemical behavior to more accurately determine the fate of chemicals used;
- Greater consumption due to increasing water production as fields age.

Chemical use in production and drilling operations is regulated in UK offshore waters by the Offshore Chemicals Regulations 2002. **Table 2** shows the historical use of offshore production chemicals across our UK production operations, along with the proportion that may have been discharged to the sea through the offshore production process as estimated by the partitioning characteristics of the chemical used. All use and discharge allowances were approved by the Regulator through chemical permits. The data shows that production chemical use in 2018 decreased compared to 2017 and the percentage of these chemicals that may have been discharged decreased by almost a quarter at 23%.

	2014	2015	2016	2017	2018
Production Chemicals (Tonnes)	3,100	4,159	4,989	5,631	3,923
% Discharged	70	56	53	60	37

Table 2: Production chemicals use and discharge (2014-2018)

The Regulator has highlighted certain chemicals to be phased out by means of substitution warnings (known as 'sub warning chemicals'). Reducing the use of these chemicals can be challenging, especially for those that have been engineered for specific fields or applications. Shell UK has been working to phase in alternative chemicals to replace sub warning chemicals as they become available on the market.

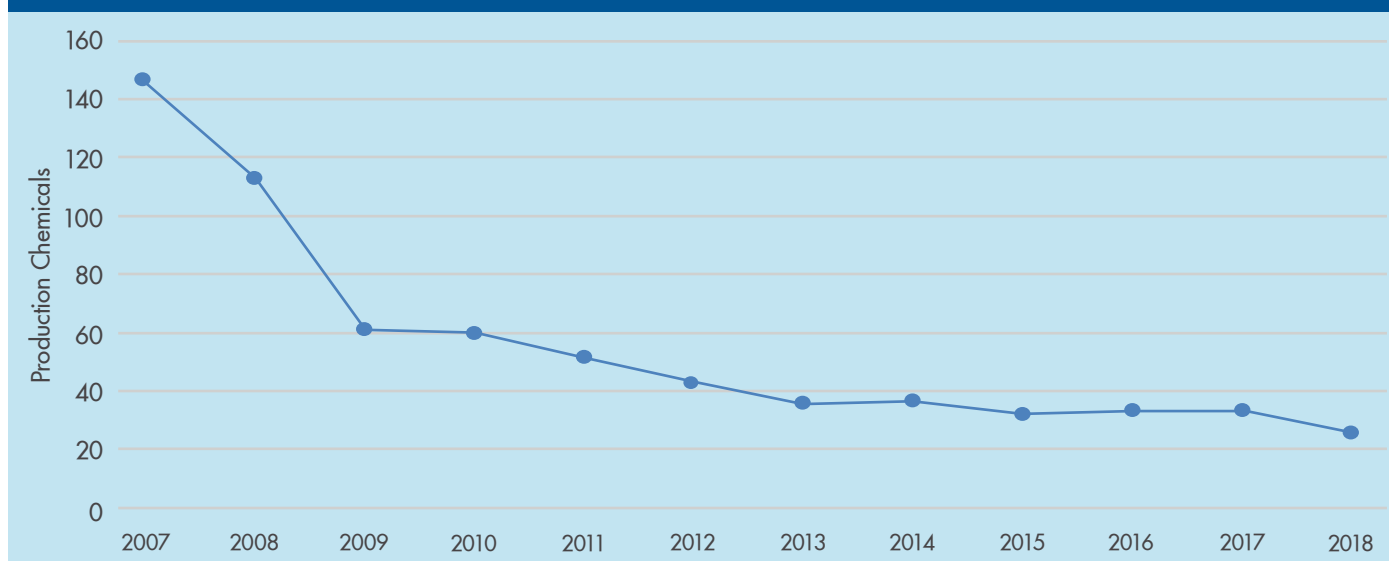
The sub warning chemical phase out plan continues, and Shell UK is committed to this work. We work with our suppliers to identify more acceptable alternatives to those chemicals with sub warnings. The overall reduction of sub warning chemicals is possible through a combination of factors:

1. Replacement of chemicals by less hazardous versions;
2. Removal of unused products from permits;
3. Divestment/decommissioning of the installations where particular product is used; and,

4. Reclassification as chemicals gain or lose the sub warning as new data becomes available, and as hazard thresholds dictate a warning change

The use of chemicals with sub warnings by Shell in the UK has, in the main decreased over the last few years (**Figure 6**). Approximately 22% of production chemicals used are chemicals which have a sub warning. In 2018 we used 24 sub warning chemicals as shown in **Figure 6**.

Figure 6: Trend in Numbers of Production Chemicals used by Shell with Substitution Warnings (2007-2018)



Wells Chemicals

In 2018, we used a total of 7,138 tonnes of chemicals in well activities as shown in **Table 3**. Of this figure approximately 9% of the chemicals were discharged to sea in accordance with the allowances of approved chemical permits from the Regulator. The volume of chemicals used and discharged is directly related to the type and number of well activities undertaken. There was no new drilling activity in 2018 and therefore the work carried out on wells was intervention and abandonment operations, particularly in the Brent field and the Goldeneye platform. There were also abandonment operations carried out on various sub-sea wells. Further details on wells operations can be seen in **Appendix 2**.

In 2018, approximately 1.85% of the total weight of well chemicals used was made up of chemicals which carry sub warnings. This is a slight increase (0.35%) from 2017 levels, and this increase is due to the nature of the work undertaken. The total tonnage of sub rated chemicals was reduced from 2017 levels and the majority of the activity in 2018 was well abandonment work. Therefore the majority of the sub chemicals used by wells were used for cementing activities and the amount has not reduced in line with the decrease in the total use of chemicals caused by the lower level of drilling activity.

	2014	2015	2016	2017	2018
Wells chemicals (Tonnes)	11,787	13,784	12,818	13,505	7,138
% Discharged	30	11	16	9	9

Table 3: Wells chemicals use and discharge (2014-2018)

WASTE MANAGEMENT

Waste is controlled across all our UK operations with our installations segregating their waste streams to ensure compliance with company standards and with applicable legal requirements.

Effective segregation of waste also allows for more environmentally acceptable routes of disposal. Waste contractors are involved with the checking, compliance and working with the operators on site, so that they understand the requirements for segregating wastes during activities at the installations. In accordance with the waste hierarchy, which ranks waste management options according to what is best for the environment, we always look at minimising any waste generated and also reducing waste volume at source.

The overall waste mass for 2018 was higher than in 2017 due primarily to an increase in the amount of non-hazardous waste generated. **Table 4** shows the total amount of hazardous and non-hazardous waste produced over the last 5 years. In 2018, we also re-used or recycled approximately 13% of our total waste materials. Examples of these are, drums/containers, scrap metal and other segregated recyclables.

In 2018, hazardous waste, which included drilling mud and cuttings from our drilling activities, contaminated water and sludge from onshore and offshore operations, waste oil, paint and chemicals, increased by 1%. Although we had fewer offshore operated facilities in 2018, our activities increased in other areas.

Non-hazardous waste, which included liquid production residues, scrap metals, wood, paper, plastics, cans and

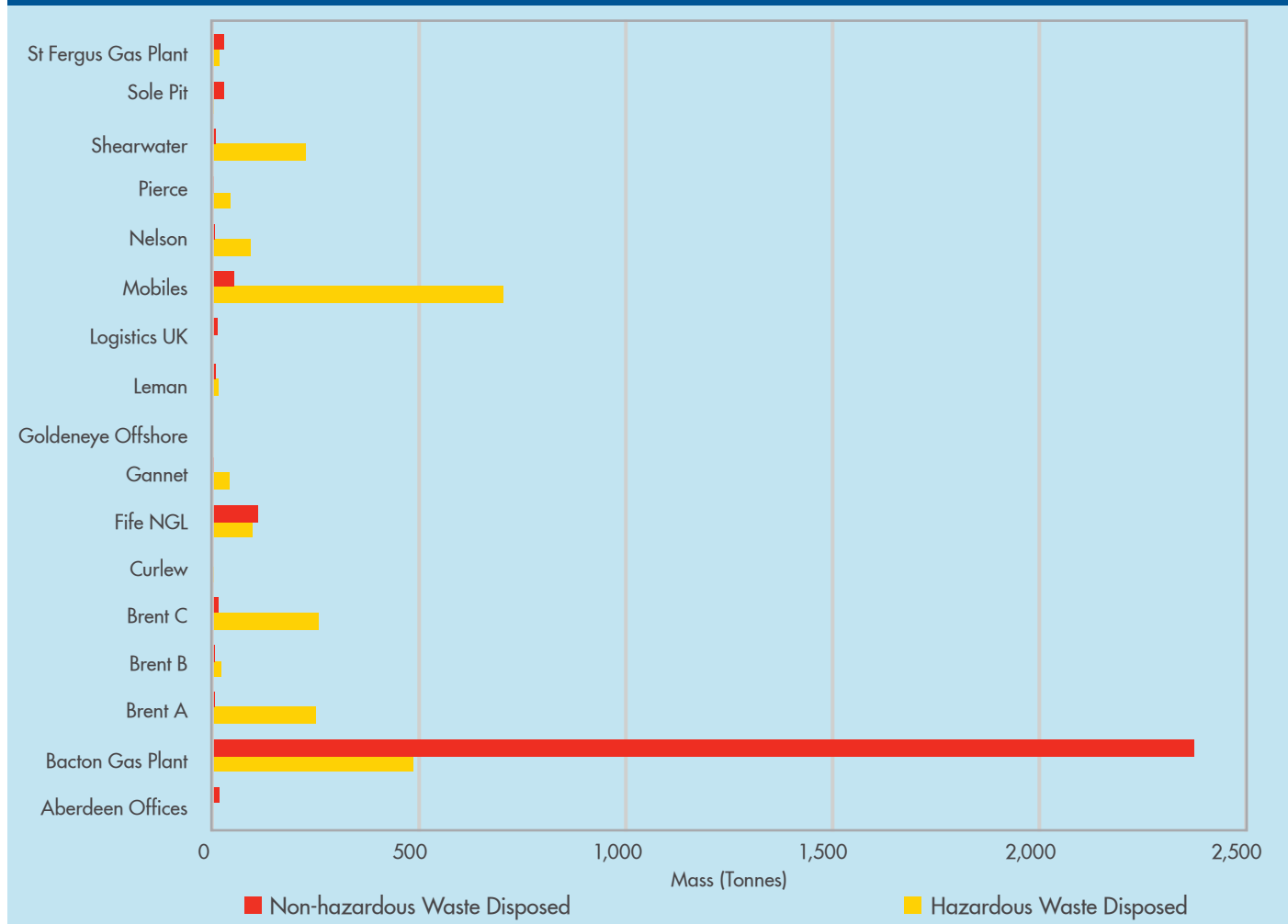
general waste increased by 85% in 2018 compared to 2017 levels. This was mainly due to the increased waste volumes generated at the Bacton Gas Terminal, where the start-up and operation of the site's desalination unit was ongoing through the year, resulting in the need to remove and transport large volumes of waste offsite for treatment and disposal. Additionally, reliability issues with the wastewater treatment plant at Bacton, led to a further increase in offsite disposal of liquid waste during 2018. A significant reduction in liquid waste is anticipated during 2019, as improvements have been made to the waste water treatment plant to ensure greater stability. Furthermore, a project to segregate rain water from process waters is due for completion in 2020; this will further reduce the requirement for offsite waste disposal.

	2014	2015	2016	2017	2018
Hazardous waste (Tonnes)	23,353	14,792	27,708	22,601	22,909
Non-Hazardous Waste (Tonnes)	29,992	33,704	17,088	14,280	27,160
Totals	53,345	48,496	44,796	36,881	50,069

Table 4: Mass (tonnes) of wastes (hazardous and non-hazardous) generated by our UK Upstream operations between 2014 and 2018



Figure 7: Mass (tonnes) of hazardous and non-hazardous waste disposed of in 2018



In **Figure 7** we show the ratio of hazardous to non-hazardous waste by location in 2018. The largest producers of hazardous waste were our mobile rigs due to the volume of wet bulk waste generated at these installations due to the nature of the operation. The Bacton Gas Terminal produced the largest amount of non-hazardous waste in 2018 due to the large volumes of liquid waste as explained on the previous page.

SHELL DECOMMISSIONING IN THE NORTH SEA



BRENT DECOMMISSIONING

The Brent oil and gas field, and its pipeline systems, is located in Block 211/29 of the UK sector of the North Sea, approximately 186 km north east of the Shetland Islands. It has been a cornerstone of the UK's hugely successful oil and gas industry for over 40 years and is one of the largest fields in the North Sea and has four large platforms - Alpha, Bravo, Charlie and Delta.

The Brent field is a prolific national asset and since 1976 has produced around three billion barrels of oil equivalent. At its peak, it was producing more than half a million barrels a day. The Regulator (BEIS) granted permission for the cessation of production from Brent Delta in 2011, and Alpha and Bravo at the end of 2014. Production from Brent Charlie is expected to come to an end in 2020.

The Brent Decommissioning Project is unique, due to the sheer scale and age of the field, the complex infrastructure, and the challenges of how to decommission the concrete legs and cells, and the cell contents. The field infrastructure is extensive and comprises: four topsides with a combined weight of over 100,000 tonnes; three gravity base structures (GBS) weighing more than 300,000 tonnes each; 31,500 tonnes of steel jacket; and 103 kilometres of pipelines. A total of 146 wells have been drilled from the 154 Brent platform well slots, and 3 subsea wells have been drilled in the Brent South field.

In 2014, the decision was made to bring forward submission of a Decommissioning Programme (DP) for the Brent Delta topside – ahead of the Programmes for the remainder of the Brent Field infrastructure. The Brent Delta topside Decommissioning Programme was approved in July 2015.

An extended 60 day Public Consultation for the full Brent Field Decommissioning Programmes took place between 8 February and 10 April 2017. In 2018, BEIS agreed that our topsides decommissioning proposals for Brent Alpha, Brent Bravo and Brent Charlie could be removed from the current

Brent Field DP, and form a separate, topsides-only DP. This was approved on 6 August 2018.

The Brent Field DP has advanced through the regulatory process to the point that BEIS submitted the derogation documentation for the three Gravity Base Structures and the Alpha footings to OSPAR on 7 January 2019.

The 24,200 tonne Delta topside was removed in 2017, which at the time was a world record offshore single lift, and taken to Able UK's Seaton Port facility in Hartlepool, north east England for dismantling and recycling. In December 2018, BEIS approved the Brent Delta Interim Decommissioning Close Out Report which describes the offshore and onshore programme of work carried out to cut, lift, transport and load-in the Brent Delta topside to Able UK's Seaton port facility. It also describes the installation of the caps and Aids to Navigation on top of the legs of the GBS.

Dismantling of the topside was completed in Q1 2019, and the component materials or 'waste streams' segregated and stored on site before being transported to other onshore facilities for re-use, recycling or disposal as appropriate. On the basis of the topside inventory, the aim is to recycle over 97% by mass of topside material. All materials will be tracked from their present location to final destination.

A final close-out report will be submitted within four months of the completion of all the onshore dismantling operations.

Elsewhere in the field, all the Brent Bravo wells were fully decommissioned in 2017, and the Brent Alpha wells plug and make safe campaign was completed in November 2018. Decommissioning of the Brent Charlie wells started in late 2017, and will continue for the next years.

Brent Bravo topside preparations are approaching completion including the engineering scopes for the lifting points, platform strengthening, and attic oil recovery, as we move towards the anticipated goal of de-manning and lifting the Bravo topside in 2019.



BRENT BYPASS AND GEP COMPLETED

In order to isolate Brent Alpha and Bravo from the Far North Liquids and Associated Gas Systems (FLAGS) as well and allow the continuing export of gas through the Western Leg Gas Pipeline (WLGP), Northern Leg Gas Pipeline (NLGP) and FLAGS export routes, a separate project was conducted to reconfigure the pipeline network. This project is referred to as the Brent Bypass Project (BBY) and was completed in two phases, starting in 2017 and ended in February 2019.

UKCS – OTHER DECOMMISSIONING ACTIVITY

In 2018 there was a significant increase in decommissioning activities for Shell in the Central North Sea (CNS).

Curlew Field

The Curlew Field is located approximately 210 kilometres east of the Aberdeenshire coastline, Scotland, and 55 kilometres west of the UK/Norway median line, in a water depth of 93 metres. The facility consists of a central processing Floating Production, Storage and Offloading (FPSO) vessel, with three subsea field tie-backs, and is connected into the Fulmar pipeline for gas export to the St Fergus onshore facility.

A draft Decommissioning Programme, which includes the Environmental Statement in support of the programme, was submitted to BEIS for the Curlew Field on 17 June 2018, and the 30 day Public Consultation closed on 18 July 2018. The DP was approved by BEIS in March 2019. Cessation of Production (CoP) was agreed for the end of March 2019, and the Curlew FPSO will be towed to Forth Ports' Dundee facility for cleaning, before being towed to Turkey for dismantling and recycling. It is anticipated that over 97% of the materials brought to shore will be recycled.

Goldeneye Field

Goldeneye is located in the Central North Sea, in the UK Continental Shelf, approximately 100 kilometres north east of the Aberdeenshire coast, Scotland, and was operational as a gas producing field from 2004. It is a wellhead platform, with a 1,400 tonnes topside, 5 platform wells in 120m water, with a direct tie-back to the St Fergus onshore facility. Cessation of production was granted in March 2011.

The platform had been preserved as a Normally Unattended Installation (NUI), and the status changed in 2018 to a Permanently Unmanned Installation (PUI). The five wells were successfully plugged and abandoned in 2018, a draft Decommissioning Programme was submitted to BEIS on 6 November 2018, and the 30-day Public Consultation closed on 5 December 2018. If and when approval is granted by BEIS, the platform will be removed and recycled onshore. It is anticipated that over 97% of the materials brought to shore will be recycled.

Subsea assets

In 2018 there was significant progress with decommissioning preparatory work on a portfolio of UKCS subsea assets including: Heron, Gannet C, Kingfisher, and Scoter and Merganser. These installations are expected to be decommissioned in the next few years, subject to regulatory approvals.



CONTACT US

This report summarises our environmental performance in relation to our HSSE & SP policy, goals and objectives in Shell U.K. Limited's upstream operations and activities.

This report is updated and published annually on our corporate website at www.shell.co.uk

For further information, please contact the Shell office in Aberdeen on 01224 882000 and ask for the External Relations department:

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APPENDIX 1

SUMMARY OF ENVIRONMENTAL DATA (2014 - 2018)

	2014	2015	2016	2017	2018
Greenhouse Gases (GHG) (tonnes CO2 equivalent)	2,335,621	2,593,723	2,743,723	2,571,161	2,227,523
Oil to Sea (tonnes) (discharged in produced water)	153	235	202	213	242
Hazardous Waste Generated (tonnes)	23,354	14,792	27,708	22,601	22,909
Non-Hazardous Waste Generated (tonnes)	29,992	33,704	17,088	14,281	27,160
Production Chemical Use (tonnes)	3,100	4,159	4,989	5,631	3,923
% Discharge	70	56	53	60	37
Wells Chemical Use (tonnes)	11,787	13,782	12,818	13,505	7,138
% Discharge	28	11	16	9	9
Unplanned Releases (tonnes)	87 (12)	64 (20)	59 (27)	53 (56)	42 (1.9)

Data may have changed from previous years reports as revisions of the data can happen after the reports have been finalised.

The figures shown above relate to all offshore installations operated by Shell U.K. Limited, and third-party fields that produce into them, plus onshore plants and mobile rigs in the UK - all as reported by Shell in the UK Environmental Emissions Monitoring System (EEMS).

APPENDIX 2

WELL ACTIVITIES IN 2018

DRILLED

Installation / Rig	Shell Well Name	Well Start Date	Decc Permit Reference
Noble Hans Deul	SW08s2 (22/30b-A17)	20/04/2017 (ended early 20128)	DRA-447-CP-1227-7 v1

ABANDONED

Installation / Rig	Shell Well Name	Well Start Date	Decc Permit Reference
Goldeneye /Rowan Viking	GYA01 (DTI 14/29a-A3)	19/10/2018	WIA-708-CP-1621-1 v2
Goldeneye /Rowan Viking	GYA02s1 (DTI 14/29a-A4z)	07/10/2018	WIA-708-CP-1621-1 v2
Goldeneye /Rowan Viking	GYA03 (DTI 14/29a-A5)	21/10/2018	WIA-708-CP-1621-1 v2
Goldeneye /Rowan Viking	GYA04 (DTI 14/29a-A1)	10/10/2018	WIA-708-CP-1621-1 v2
Goldeneye /Rowan Viking	GYA05 (DTI 14/29a-A2)	14/10/2018	WIA-708-CP-1621-1 v2
Wilphoenix	Puffin (DTI 29/05a-5)	20/12/2018	WIA-728-CP-1725-3 v1
Brent Alpha	BA24s1 (211/29-A26Z)	10/01/2018	WIA-601
Brent Alpha	BA19 (211/29-A4)	09/03/2018	WIA-601
Brent Alpha	BA20S4 (211/29-A42)	30/03/2018	WIA-601
Brent Alpha	BA23S2 (211/29-A45)	06/04/2018	WIA-601
Brent Alpha	BA09 (211/29-A44)	04/05/2018	WIA-601
Brent Alpha	BA04S2 (211/29-A54)	09/05/2018	WIA-601
Brent Alpha	BA14 (211/29-A34)	27/05/2018	WIA-601
Brent Alpha	BA28 (211/29-A50)	13/09/2018	WIA-601
Brent Alpha	BA08S3 (211/29-A48)	10/10/2018	WIA-601
Brent Alpha	BA07S1 (211/29-A53)	21/10/2018	WIA-601
Brent Alpha	BA21S1 (211/29-A22Z)	25/11/2018	WIA-601
Brent Alpha	BA07S1 (211/29-A53)	22/12/2018	WIA-601
Brent Alpha	BA08S3 (211/29-A48)	23/12/2018	WIA-601
Brent Charlie	BC38S1 (211/29-C49)	11/02/2018	WIA-600
Brent Charlie	BC40S1 (211/29-C54)	05/03/2018	WIA-600
Brent Charlie	BC20S2 (211/29-C42)	13/03/2018	WIA-600
Brent Charlie	BC04S2 (211/29-C53)	03/04/2018	WIA-600
Brent Charlie	BC03S2 (211/29-C47)	29/05/2018	WIA-600
Brent Charlie	BC29S1 (211/29-C25)	11/09/2018	WIA-600
Brent Charlie	BC12S1 (211/29-C41)	14/10/2018	WIA-600

APPENDIX 3

ABBREVIATIONS AND TERMINOLOGY

BBL	Balgzand Bacton Line
BBY	Brent Bypass project
BEIS	Department of Business, Energy and Industrial Strategy
CNS	Central North Sea
CO₂e	Carbon dioxide equivalent is a term for describing different greenhouse gases in a common unit. For any quantity and type of greenhouse gas, CO ₂ e signifies the amount of CO ₂ which would have a climate change global warming impact
CoP	Cessation of Production
DP	Decommissioning Programme
EA	Environment Agency
EEMS	Environmental Emissions Monitoring System (Oil & Gas U.K.)
EIA	Environmental Impact Assessment
ESOS	Energy Savings Opportunity Scheme
FEP	Fife Ethylene Plant
FLAGS	Far Northern Liquids and Associated Gas System
FLIR	Forward Looking Infrared
FNGL	Fife Natural Gas Liquids plant
FPSO	Floating Production Storage and Offloading vessel
GEP	Gas Export Pipeline
GBS	Gravity Based Structure
GHG	Greenhouse gases (mainly carbon dioxide, methane, nitrous oxide and HFC's)
HLV	Heavy Lift Vessel
HSE	Health, Safety and Environment
HSSE & SP	Health, Safety, Security, Environment and Social Performance
INSITE	Influence of man-made Structures In the Eco-system
ISO 14001	International Standard Specification for Environmental Management Systems
LP	Low Pressure
NAI	Normally Attended Installation
NERC	Natural Environmental Research Council
NGL	Natural Gas Liquids
NLGP	Northern Leg Gas Pipeline
Nm	Nautical Miles
NUI	Normally Unattended Installation
OGI	Optical Gas Imaging
OSPAR	Convention for the Protection of the Marine Environment of the North-East Atlantic. In 1998 this replaced the Oslo Convention (for the Prevention of Marine Pollution by Dumping from Ships and Aircraft) and the Paris Convention (for the Prevention of Marine Pollution from Land-Based Sources).
PON1	Petroleum Operations Notice type 1. BEIS requires Operators to report any oil or chemical spills, sheens, or excessive discharges to their Offshore Inspectorate using a PON1 form available on their website at https://www.og.berr.gov.uk/regulation/pons/index.htm

SEAL	Shearwater-Elgin Area Line
SEPA	Scottish Environmental Protection Agency
SLV	Single Lift Vessel
SNS	Southern North Sea
SPIDA	Screening Potential Impacts of Decommissioning Activities
UKCS	United Kingdom Continental Shelf
WLGP	Western Leg Gas Pipeline

CAUTIONARY STATEMENT

The companies in which Royal Dutch Shell plc directly and indirectly owns investments are separate legal entities. In this report “Shell group” and “Royal Dutch Shell” are sometimes used for convenience where references are made to Royal Dutch Shell plc and its subsidiaries in general. In this report all references to “Shell” refers specifically to Shell UK Upstream business. Likewise, the words, “we”, “us” and “our” are also used to refer to Shell UK Upstream business in general or to those who work for them. These terms are also used where no useful purpose is served by identifying the particular entity or entities. “Subsidiaries”, “Shell subsidiaries” and “Shell companies” as used in this report refer to entities over which Royal Dutch Shell plc either directly or indirectly has control. Entities and unincorporated arrangements over which Royal Dutch Shell has joint control are generally referred to as “joint ventures” and “joint operations” respectively. Entities over which Royal Dutch Shell has significant influence but neither control nor joint control are referred to as “associates”. The term “Shell interest” is used for convenience to indicate the direct and/or indirect ownership interest held by Royal Dutch Shell in an entity or unincorporated joint arrangement after exclusion of all third-party interest.

This report contains forward-looking statements (within the meaning of the U.S. Private Securities Litigation Reform Act of 1995) concerning the financial condition, results of operations and businesses of Royal Dutch Shell. All statements other than statements of historical fact are, or may be deemed to be, forward-looking statements. Forward-looking statements are statements of future expectations that are based on management’s current expectations and assumptions and involve known and unknown risks and uncertainties that could cause actual results, performance or events to differ materially from those expressed or implied in these statements. Forward-looking statements include, among other things, statements concerning the potential exposure of Royal Dutch Shell to market risks and statements expressing management’s expectations, beliefs, estimates, forecasts, projections and assumptions. These forward-looking statements are identified by their use of terms and phrases such as “aim”, “ambition”, “anticipate”, “believe”, “could”, “estimate”, “expect”, “goals”, “intend”, “may”, “objectives”, “outlook”, “plan”, “probably”, “project”, “risks”, “schedule”, “seek”, “should”, “target”, “will” and similar terms and phrases. There are a number of factors that could affect the future operations of Royal Dutch Shell and could cause those results to differ materially from those expressed in the forward-looking statements included in this report, including (without limitation): (a) price fluctuations in crude oil and natural gas; (b) changes in demand for Royal Dutch Shell’s products; (c) currency fluctuations; (d) drilling and production results; (e) reserves estimates; (f) loss of market share

and industry competition; (g) environmental and physical risks; (h) risks associated with the identification of suitable potential acquisition properties and targets, and successful negotiation and completion of such transactions; (i) the risk of doing business in developing countries and countries subject to international sanctions; (j) legislative, fiscal and regulatory developments including regulatory measures addressing climate change; (k) economic and financial market conditions in various countries and regions; (l) political risks, including the risks of expropriation and renegotiation of the terms of contracts with governmental entities, delays or advancements in the approval of projects and delays in the reimbursement for shared costs; and (m) changes in trading conditions. No assurance is provided that future dividend payments will match or exceed previous dividend payments. All forward-looking statements contained in this report are expressly qualified in their entirety by the cautionary statements contained or referred to in this section. Readers should not place undue reliance on forward-looking statements. Additional risk factors that may affect future results are contained in Royal Dutch Shell’s 20-F for the year ended December 31, 2018 (available at www.shell.com/investor and www.sec.gov). These risk factors also expressly qualify all forward looking statements contained in this report and should be considered by the reader. Each forward-looking statement speaks only as of the date of this report, June 1, 2019. Neither Royal Dutch Shell plc nor any of its subsidiaries undertake any obligation to publicly update or revise any forward-looking statement as a result of new information, future events or other information. In light of these risks, results could differ materially from those stated, implied or inferred from the forward-looking statements contained in this report.

We may have used certain terms, such as resources, in this report that United States Securities and Exchange Commission (SEC) strictly prohibits us from including in our filings with the SEC. U.S. Investors are urged to consider closely the disclosure in our Form 20-F, File No 1-32575, available on the SEC website www.sec.gov.

