

**2017 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 has been a leading player in the North Sea for over 50 years, delivering vital energy, jobs and economic benefits to the UK through its upstream exploration and production operations in the UK sector of the North Sea and onshore gas processing.

This is the 2017 annual environmental statement for Shell U.K. Limited. The 2017 environmental performance of Shell's upstream operated facilities in the UK, both offshore and onshore, is summarised in this report. The data used in this report has been previously reported to the UK environmental Regulators via the Environmental Emissions Monitoring System (EEMS), for offshore, and the Pollution Inventory (England) and Scottish Pollutant Release Inventory (Scotland), for onshore.

In the UK, in 2017, Shell produced oil and gas from more than 65 interests in the North Sea, operating 33 offshore installations and two Floating Production Storage and Offloading (FPSO) vessels. Through these activities we produce approximately 10% of the UK's oil and gas. Onshore we own and operate pipeline systems and processing terminals that are responsible for delivering more than 20% of the UK's gas supply.

On 1st November 2017, Shell UK divested a package of UK North Sea assets to Chrysaor, this included the Shell operated Armada cluster, Everest and Lomond assets and Shell's total non-operated interests in Buzzard, Beryl, Bressay, Elgin-Franklin, J-Block, and Erskine plus a 10% stake in the Schiehallion field. This statement includes the data for those divested assets that were operated by Shell up until the 1st of November 2017 (Armada, Everest & Lomond).

TERMINOLOGY USED IN THIS STATEMENT

Installations refers to:

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

Facilities refers to operating installations covering:

- Our operated offshore platforms and FPSOs;
- Wells and associated subsea infrastructure

Functions refers to services required to operate the facilities (e.g. health, safety, security, environment and social performance management, technical and process assurance, project and development planning, logistics (vessels and helicopters), laboratory services, and office management).

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



WHAT WE DO

In 2017, Shell's upstream offshore and onshore activities operated by Shell in the UK and 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):** 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:** an FPSO. Producing reservoirs are tied back to the Curlew FPSO via subsea wells based around three drilling centres.
- **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:** consisting of four platforms, Brents Alpha, Bravo, Charlie and Delta. Brent Delta ceased production at the end of 2011 and the topsides were removed and shipped to shore for dismantling in May 2017. Production ceased at Brents Alpha and Bravo in late 2014. 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 St Fergus Gas Plant. The Goldeneye field ceased production in 2011.
- **Armada:** the Armada hub platform which produces gas/condensate from the Drake, Fleming, Hawkins and Seymour fields in addition to the Rev and Guape fields tied back from the Norwegian sector of the North Sea (divested to Chrysaor on 1st November 2017).
- **North Everest:** a wellhead, production platform producing from the North Everest gas/condensate field as well as South Everest subsea wellheads and Everest East Expansion via tie-backs (divested to Chrysaor on 1st November 2017).
- **Lomond:** a wellhead, production platform producing from the Lomond and Erskine gas/condensate fields (divested to Chrysaor on 1st November 2017).
- **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.
- **Leman A:** a NAI in the Southern 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'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 Exxon Mobil's adjacent Fife Ethylene Plant (FEP) as feedstock, the remaining products are transported via pipeline to the Shell operated marine terminal at Braefoot Bay on the Firth of Forth for loading onto ships for export. Some products are also exported by road tankers.
- **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, visit our website at www.shell.co.uk/about-us/what-we-do

ENVIRONMENTAL PERFORMANCE

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 or minimise negative impact by carefully considering the impact Shell may have on the environment and the communities we share it with; before, during and at the end of our operations.

Shell's commitment and policy on Health, Safety, Security, Environment and Social Performance (HSSE & SP) is included on page 7. Our Health, Safety and Environment (HSE) Management System drives continuous improvement in our approach to environmental risk management and performance. This includes our commitment to compliance with the environmental regulations which apply in the oil and gas sector in the UK, including the UK North Sea, which we aim to comply with during all of our activities. 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:

- Protecting the environment
- Using materials and energy efficiently to provide our products and services
- Setting targets for improvement and monitoring performance
- Playing a leading role in promoting best practice in our industries
- Engaging effectively with stakeholders

These objectives are translated into relevant programmes that aim to drive continual improvement in our UK operations. In 2017 the main focus areas related to environmental performance in the UK sector of our business included:

- Update to our greenhouse gas emissions and energy management strategy and processes
- Further improvement in energy efficiencies at our own operations by implementing additional energy use reduction opportunities identified during a 2015 energy audit
- Methane emissions management at the St Fergus Gas Plant with focus on the optimisation of the emissions from the cold vent
- Upgrade of leak detection and repair processes

- Finalisation of the environmental impact assessment programme for the Penguins project
- Ongoing consultation on the decommissioning programme for the decommissioning of the Brents facilities
- Transferring field management and performance systems, data, permits and consents in support of the divestment to Chrysaor
- Community engagement and technical and operational measures at the Shell Fife NGL plant following a flaring event in June that caused community concern. We have since cooperated with the onshore Regulator SEPA and worked closely with our neighbours at the ExxonMobil operated Fife Ethylene Plant on measures that will help avoid the circumstances arising again



Environmental improvement programmes and achievements in 2017 included:

- Preparation of an up to date greenhouse gas and energy management plan for each asset, documenting greenhouse gas management planning and processes along with individual facility specific targets and initiatives
- Successful delivery of additional energy efficiency opportunities at our offshore facilities
- Purchase of additional forward looking infrared (FLIR) cameras, so that every Shell operated facility in the UK has FLIR capability allowing more efficient detection and repair of small fugitive losses of gas from piping and equipment
- Development of a venting continuous improvement plan at the St Fergus Gas Plant. Work in 2017 included refinements in the method for calculating vented volumes which led to an approximately 60% reduction in reported volumes
- Internal and Regulator approval of the environmental impact assessment for the Penguins project, supporting the final investment decision for this major project
- Conclusion of the initial phase of the INSITE (INfluence of man-made Structures In The Ecosystem) programme, supported by Shell. Shell intend to continue to support and participate in the next phase of this joint industry/academic programme
- Completion of a pilot project to assess the role of subsea pipelines in the marine ecosystem in partnership with Marine Scotland Science. The methodology developed is being applied to the assessment of subsea pipelines in the UK North Sea
- Contribution to the development of a screening database to use for screening potential impacts of decommissioning activities (SPIDA) with NERC. The database tool is specific to the North Norfolk Sandbanks and the Saturn Reef Special Area of Conservation and its conservation features and is used to help determine the most sustainable methods for decommissioning marine infrastructure while protecting the marine environment



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.



EMISSIONS AND DISCHARGES

Greenhouse Gas Emissions

Emissions to air that result from our operations are principally due to the combustion of fuel gas to drive power generation and gas compression at our facilities. Other sources are from the flaring and venting of gas which is essential for safety reasons, as well as emissions from the combustion of diesel in the engines on mobile drilling rigs, ships and in some diesel generators used at our facilities. The main sources of greenhouse gas (GHG) emissions from our operations are described below with the proportions of the total from each main source in 2017 illustrated in **Figure 1**.

Main sources of GHG emissions:

1. Emissions from the combustion of fuels (gas and diesel) for power generation, compression drives, heaters, pumps and engines. Figure 1 shows that, combustion emissions from fuel gas is the largest contributor to our total GHG emissions at around 74% of the total. Emissions from the combustion of diesel, largely used in back-up generators and on mobile drilling units, amounts to 6% of the total.
2. Flaring emissions include emissions from the flare pilot flame maintained at offshore facilities which is used to ignite hydrocarbon gases, should their safe disposal be required. In 2017 flaring events occurred in support of routine maintenance activities, equipment and plant trips, shut-down and start-up activities and bringing new wells on line until production is stabilised. GHG emissions from flaring amounted to just over 13% of total GHG emissions in 2017.

3. Some of our installations are designed to vent gas for safety reasons, this includes our unmanned gas platforms in the southern North Sea and the gas processing plant at St Fergus. GHG emissions from venting amounted to approximately 6% of our total in 2017.
4. GHG emissions through small fugitive losses, mainly from equipment and pipework connections amounted to less than 1% of the total in 2017.

Direct Greenhouse Gas (GHG) emissions from our operations in 2017 totalled 2.57 million tonnes of CO₂ equivalent (CO₂e), a 5% decrease on the 2.74 million tonnes CO₂e emitted in 2016. Figure 2 below illustrates the level of difference in the emission sources in 2017 relative to 2016 data. The figure highlights the overall improved performance in 2017, with the exception of venting where an increase in emissions was confirmed.

As can be seen in **Figure 2**, the largest source of reduction between 2016 and 2017 was from a marked decrease in GHG emissions from flaring activities (over 158 kilotonnes less in 2017 compared to 2016, a 47% reduction). The largest contribution to the reduction in flaring were:

- at Brent Charlie where the facility was shut down for a prolonged period in 2017;
- Shearwater where the gas composition at a single well brought on stream in late 2017 prevented flaring of the low pressure system;
- a significant reduction in the need to flare gas on Pierce where gas re-injection was re-established in 2017; and,
- Divestment of the three operated platforms (Armada, Everest and Lomond) on the 1st November also contributed.

FIGURE 1
Greenhouse Gas Emissions By Source 2017

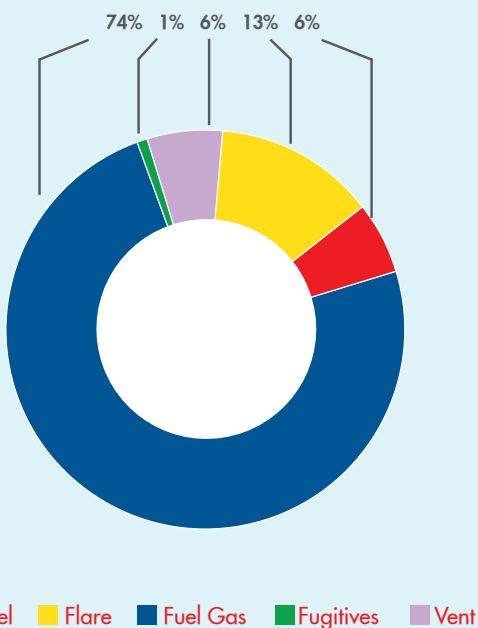
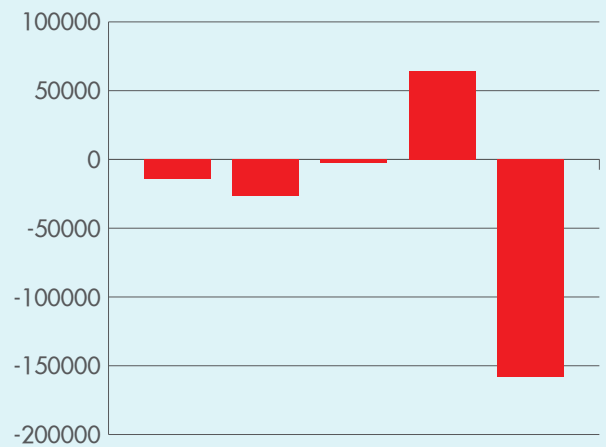


FIGURE 2
GHG Emission 2017 Performance Relative to 2016



	Diesel	Flare	Fuel Gas	Fugitives	Vent
CO ₂ Equivalent (Tonnes)	-13947	-158100	-26442	-2737	64139

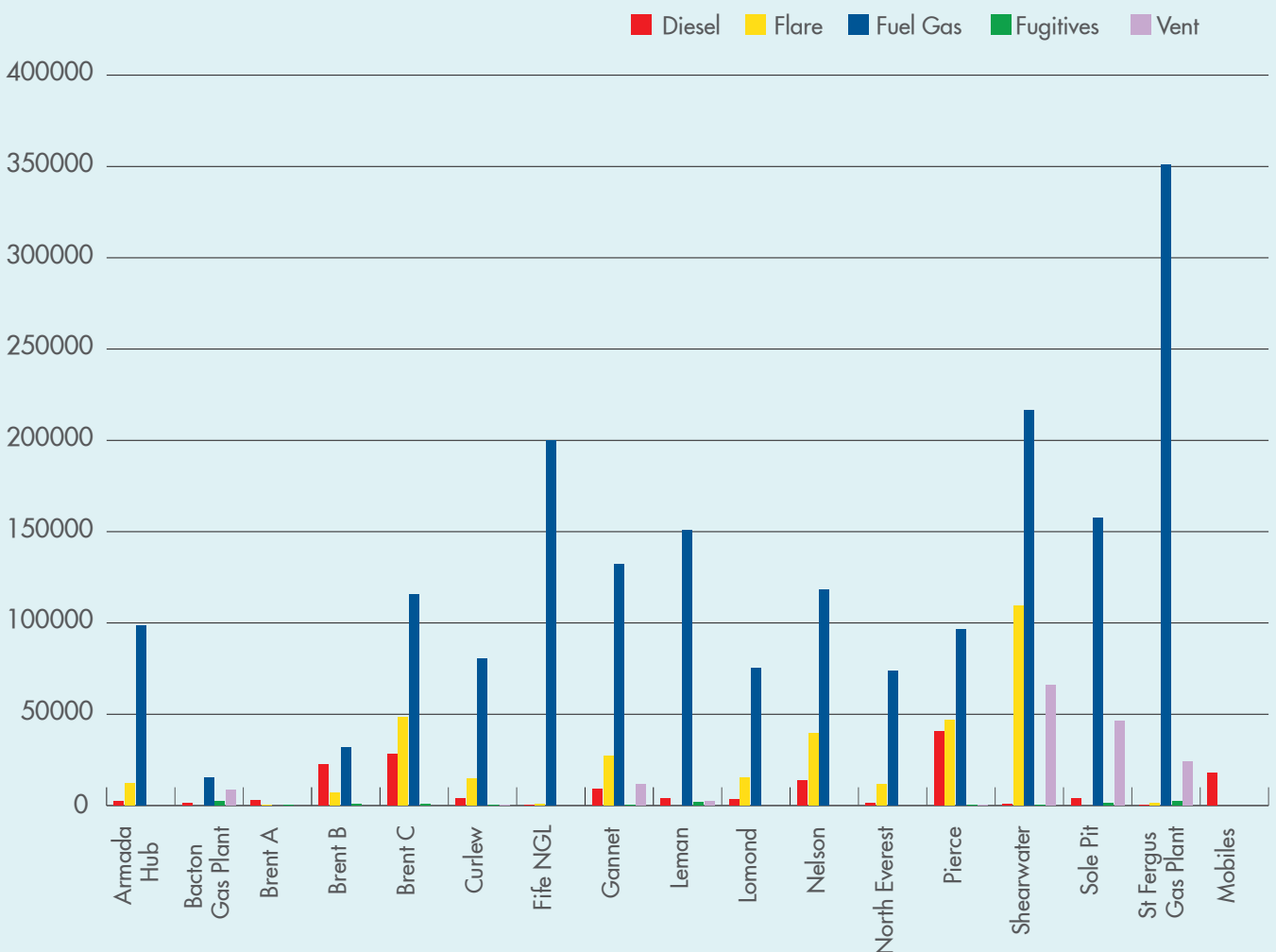
Increased emissions through venting in 2017, which included periodic unlit flare system events, were related to the unusually high CO₂ gas content from a single well at Shearwater. This made it impossible to light the flare of the low pressure system which meant the LP flare stack remained unlit in the latter part of the year. Relatively smaller venting events were also experienced at Gannet due to an unlit flare stack which occurred for short durations.

The reduction in GHG emissions as a result of diesel combustion of 9% between 2016 and 2017, was mainly due to the decreased use of mobile drilling rigs relative to 2016. Across the other assets some increases were noted in diesel usage, due in most cases, to the periodic unavailability of fuel gas systems, but these emissions were partially offset by decreased fuel gas usage. Exceptions to this general picture were at the Pierce facility where increases in both fuel gas and diesel usage were recorded due to the increased availability of that asset relative to 2016; and, the Bacton gas plant where decreases in both parameters were recorded due to the completion of the Bacton regeneration project with associated reduction in temporary generation equipment, and in the case of fuel gas, the introduction of more efficient electrical propane compressors on site.

Figure 3 shows the total greenhouse gas emissions by source at each operated facility from Shell's UK operated upstream activities in 2017 illustrating the largest source at all facilities (except mobile drilling rigs) was the combustion of fuel gas to power electricity generation and gas compression requirements for production, processing and export requirements.

The St Fergus gas processing plant is the highest individual contributor to GHG emissions from our operated facilities. This is primarily due to the energy required to process the throughput at this plant. 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 high performance industry benchmark for this type of facility. In addition, it should also be noted that refinements to the Regulator-approved method for calculating vented volumes, led to an approximately 60% reduction in vent volumes reported from the plant.

FIGURE 3
Greenhouse Gas Emissions By Source Per Facility 2017 (Tonnes CO₂e)



ENERGY USE & RESOURCE MANAGEMENT

Shell seeks to identify opportunities to improve the efficient use of energy at our operational sites. Stability of production at our facilities is a key factor in improving energy efficiency. We continued with initiatives in 2017 to improve the reliability of the equipment on our installations and enhance our maintenance activities to increase system availability.

In addition, energy use improvement opportunities are identified, as part of each asset's GHG and energy management strategy. A wide-ranging energy efficiency audit was carried out at our UK operated facilities in 2015 as part of the UK Government's Energy Savings Opportunity Scheme (ESOS). Since then a number of energy efficiency improvement opportunities have been delivered.

Further energy saving opportunities delivered in 2017 included:

- Improved efficiency of the flash gas compressor on the Shearwater platform (through enhancing the response of the recycle valves) resulting in a sustained drop in compressor load with attendant savings in CO₂ and efficiency gains in other related equipment
- Conversion of the diesel power generators on the Pierce facility to run on both fuel gas and diesel resulting in a reduction in the use of diesel and enhanced use of cleaner burning natural gas. In addition, air filters were fitted to all three gas turbines to improve efficiency
- Gas turbine filters were changed out to improve turbine efficiency on the Gannet platform



OIL IN PRODUCED WATER

Water produced with oil and gas is separated from the hydrocarbons during offshore production operations. It contains dispersed oils that are treated to permitted levels before it is discharged. The OSPAR Recommendations are regulated through the Offshore Petroleum Activities (Oil Pollution Prevention and Control) Regulations. In 2006, OSPAR set a reduction target in total oil in produced water quantities of 15% below levels discharged to sea in 2000. We have maintained our total oil in produced water below this level since the target was introduced in 2006.

Figure 4 shows the amount of oil, in tonnes, discharged to sea in produce water in 2017 from installations which we operate in the UKCS. Levels are within the amounts set by the Regulator (BEIS) and the total amount of oil discharged shows a slight increase compared to 2016, 202 tonnes in 2016 compared with 213 tonnes in 2017.

Annual average concentrations at each facility are presented in **Figure 5**. Monitoring has shown that our operations were typically in compliance with the monthly average limit in 2017 apart from a few occasions when the limit of 30mg/l (parts per million) was exceeded. This was usually due to non-routine conditions when, for example, new wells were brought on line or due to process upsets that led to higher levels of oil entering the water treatment system for a short duration. These upsets were quickly brought under control. Water treatment issues experienced on the Shearwater installation in 2016 continued into 2017, however no further breaches in the oil in water limit were measured following remedial activities performed at the facility during a scheduled platform maintenance shutdown in August.



FIGURE 4
Total Volume of produced water and mass of oil discharged to sea from each Shell operated offshore installation in 2017

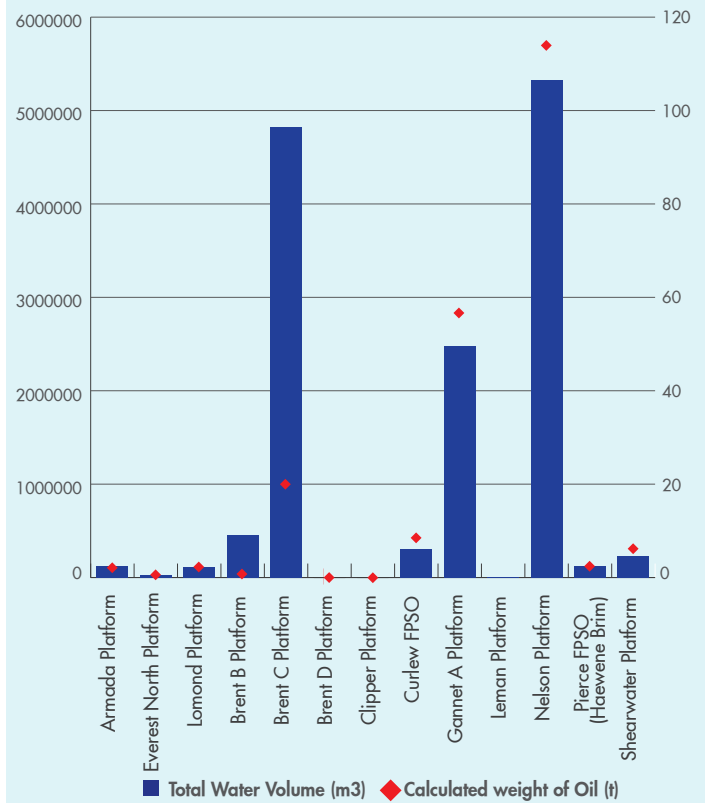


FIGURE 5
Annual average dispersed oil concentrations in produced water from each Shell operated offshore installation in 2017



UNPLANNED RELEASES

All unplanned releases of oil and chemicals from Shell's UK operations are recorded and reported to the offshore environmental Regulator (BEIS), regardless of the volume. Unplanned releases are reported individually to the Regulator at the time of the release using a Petroleum Operations Notice (PON1) and BEIS publish an annual list of PON1s for all operators in the North Sea. **Table 1** below presents the total number and mass of spills from Shell UK operations over the last five years. A total of 53 unplanned releases to sea of oil and chemicals from our operations occurred in 2017, a reduction in the number of spills compared to 2016.

Spill reduction continues to be an area of focus for all our facilities and efforts are ongoing to reduce the number of unplanned releases.

The majority of the releases were very small with 32 of the 53 recorded in 2017 being below 10 kg (<0.01 tonne), 14 were estimated to be greater than 100 kg (0.1 tonne) with three of these estimated to be greater than 2 tonnes. These three releases amounted to a total of 36.7 tonnes (87% of the 2017 total estimate) and were as follows:

- a loss of drilling fluids held in the annulus of a suspended well estimated to amount to 30.2 tonnes. The loss of these fluids was discovered when the well was accessed for plug and abandonment operations
- an estimated 4.3 tonne loss of the dehydrating agent glycol from the reboiler system onboard an offshore facility. The loss to sea was with the produced water discharge through the facility water treatment system
- a cumulative amount of base oil released to sea from the well annulus through an ongoing minor leak from a sub-sea well. The total amount released from this leak by the end of 2017 was estimated to be 2.3 tonnes

An additional release reported is still under internal investigation. This is related to the loss of a well control hydraulic fluid which it is believed to be lost down hole, however further investigation is required to confirm the loss was not to sea.

Table 1: Number and Mass of Spills to Sea (2013-2017)

	2013	2014	2015	2016	2017
Number of Oil & Chemical Spills (Includes spills <100kg)	76	87	64	59 *	53 **
Mass of Oil & Chemical Spills (tonnes)	197	12	20	27	56.1

(*which includes 5 under Regulatory Review)
(** which includes 20 under Regulatory Review)

CHEMICAL MANAGEMENT

Production Chemicals

The type and volume of production chemicals used in our operations varies across our facilities depending on their requirements. Production chemicals use is affected by various factors, including:

- Use of more efficient chemicals that reduce amounts and concentrations required
- Improved knowledge of chemical behaviour 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. The data shows that production chemical use in 2017 increased by 13 % compared to 2016 and the percentage of these chemicals that may have been discharged increased by 7%.

The increase in production chemical use is mainly due to increased production from our facilities compared to 2016. Several large volume chemical soaks were also carried out to remove pipeline wax deposits from our facilities.



Table 2: Production Chemical Use & Discharge (2013 - 2017)

	2013	2014	2015	2016	2017
Production Chemical Use (tonnes)	2680	3100	4159	4989	5631
% Discharged	60	70	56	53	60

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

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 can be achieved 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
4. Reclassification as chemicals gain or lose the sub warning as new data become 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 19% of production chemicals used are chemicals which have a sub warning. In 2017 we used 33 sub warning chemicals as shown in Figure 6.

Wells Chemicals

In 2017, we used a total of 13,505 tonnes of chemicals in well activities as shown in Table 3. Of this figure approximately 8.5 % of the chemicals were discharged to sea in accordance with the allowances of approved chemical permits. The volume of chemicals used and discharged is directly related to the type and number of well activities undertaken. A large part of the well activity in 2017 was related to well drilling in the Shearwater field, the plugging and abandonment of wells associated with the Brent decommissioning programme and also in the Atlantic and Cromarty fields. Further details on wells drilled can be seen in Appendix 2.

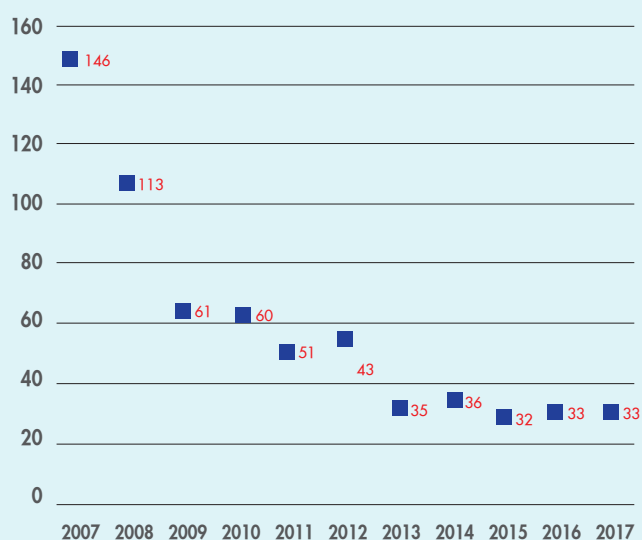
Table 3: Wells Chemicals Use and Discharge (2013-2017)

	2013	2014	2015	2016	2017
Wells Chemical Use (tonnes)	21095	11787	13784	12818	13505
% Discharged	27	30	11	16	8.5

In 2017, approximately 1.5 % of the total weight of well chemicals used was made up of chemicals which carry sub warnings. This is a reduction of nearly 2% from 2016 levels, and is a reflection of the continuing drive to find more environmentally acceptable replacements for chemicals with substitution labels.

FIGURE 6

Trend in Numbers of Production Chemicals used by Shell with Substitution Warnings (2007-2017)



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 legal requirements.

Effective segregation of wastes 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 first at reducing waste volumes at source and minimising any waste generated.

The overall waste mass for 2017 was lower than in 2016 with a reduction in the amount of both hazardous and non hazardous waste – which showed reductions of 18% and 15% respectively.

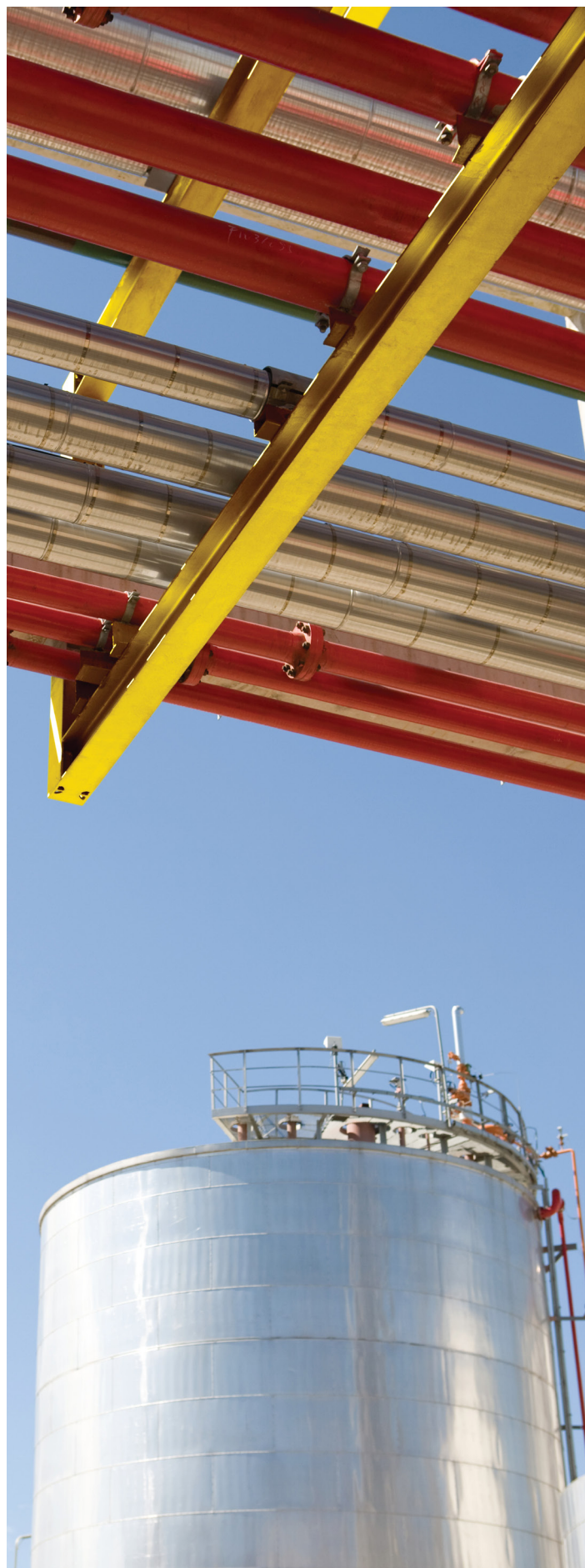
Table 4 shows the total of hazardous and non hazardous waste produced over the last 5 years. In 2017, in addition, we also re-used or recycled approximately 20% of our total waste materials. Examples of these are drums and containers, scrap metal and other segregated recyclables.

Hazardous waste, which includes drilling mud and cuttings from our drilling activities, contaminated water and sludge from onshore and offshore operations, waste oil, paint and chemicals, decreased in 2017. Other contributory examples to the reduction include, Brent B which carried out a full well plug and abandonment campaign over 2016, moving to a decommissioning phase into early 2017. Brent A also commenced a well plug and abandonment campaign in 2017.

Non-hazardous waste, which includes scrap metals, wood, paper, plastics, cans, general waste, decreased again in 2017 compared to 2016 levels. This reduction is partly due to reclassification of waste type at the Bacton plant and also in part due to the divestment of three Shell offshore facilities in November.

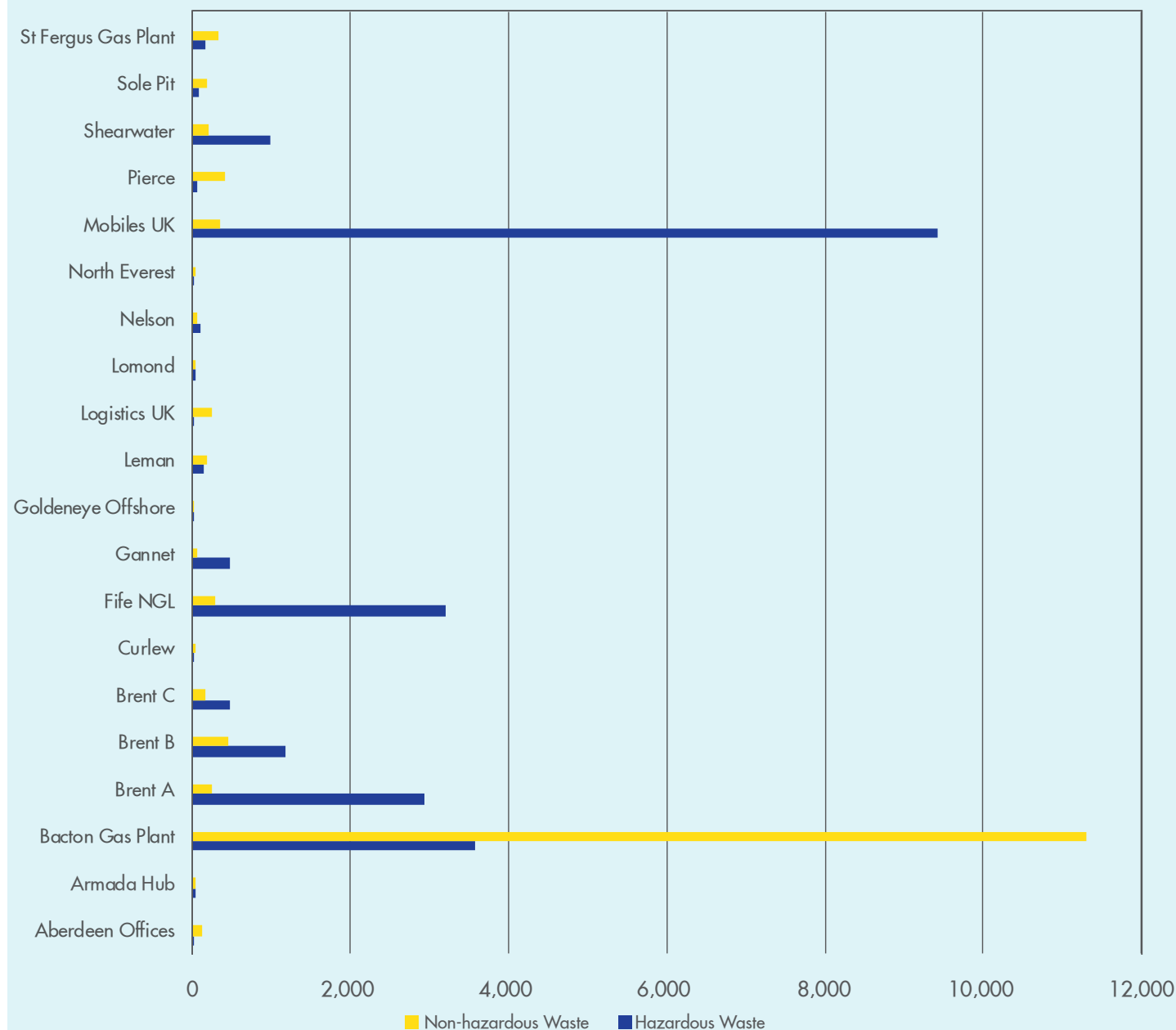
Table 4: Mass (tonnes) of wastes (hazardous and non-hazardous) generated by our UK Upstream operations between 2013 and 2017

	2013	2014	2015	2016	2017
Hazardous Waste (Tonnes)	38490	23353	14792	27708	22601
Non-Hazardous Waste (Tonnes)	53456	29992	33704	17088	14281
Total (Tonnes)	91946	53345	48496	44796	36882



In **Figure 7** we can see the ratio of hazardous to non hazardous waste by location in 2017. It should be noted when comparing 2016 and 2017 data at the Bacton Gas Plant that there is a reversal in the ratio of hazardous and non hazardous waste. This is due to increased control by improving waste sampling and analysis and subsequent changes to the classification of liquid waste streams. Bacton had an overall slight increase in total waste in 2017 compared to 2016 due to the commissioning of a new desalination plant as part of on-site improvements.

Figure 7: Mass (tonnes) of waste generated by location in 2017



SHELL DECOMMISSIONING in the NORTH SEA

Brent Decommissioning

The Brent oil and gas field, and its pipeline systems are 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. BEIS (formally DECC) 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 within a few years.

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 based structures weighing more than 300,000 tonnes each; 31,500 tonnes of steel jacket; and 103 km 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.

The decommissioning of the Brent Field and facilities is one of the most significant decommissioning projects in the North Sea and is likely to span well over a decade. Shell began decommissioning studies in 2006, long before cessation of production, and communication and engagement with a wide range of stakeholders has continued since 2007.

Decommissioning in the UK sector of the North Sea takes place under a mature regulatory process stipulated in the UK's Petroleum Act and regulated by BEIS, and in accordance with the framework of the OSPAR (Oslo/Paris Convention) 98/3 Decision. This requires that, at the end of their life, qualifying offshore installations must be removed from the sea. However, within both the UK and OSPAR regulatory framework it is recognised that there may be particular difficulties associated with the removal of large steel structures or the gravity bases of concrete platforms. In such situations, owners are able to make a case for exemption from the general rule of complete removal, known as a 'derogation'.

In 2014, the decision was made to bring forward submission of a Decommissioning Programme for the Brent Delta topside – ahead of the Programme 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. Public notifications were published in local and national newspapers to provide the opportunity for representations to be made regarding the programmes. The Consultation Draft Decommissioning Programmes Document and its supporting documentation, including the Environmental Statement, were available through the Brent Decommissioning website www.shell.co.uk/brentdecomm and on the BEIS website (<https://www.gov.uk/guidance/oil-and-gas-decommissioning-of-offshore-installations-and-pipelines>). All the referenced supporting material (technical studies and reports) were also available upon request. Letters or emails were sent to every stakeholder and all parties who registered their interest during the dialogue sessions, to inform them about the period of statutory consultation.

We received over 100 comments during this 60-day period of public consultation, from a total of 21 individuals and 17 organisations. All the comments were considered, and where appropriate the Decommissioning Programmes document and its supporting documentation updated.

Our recommendations contained within the Programmes are the result of 10 years of exhaustive studies, the completion of a detailed comparative assessment process and extensive stakeholder engagement.

In order to understand the environmental impact of the recommendations an Environmental Impact Assessment (EIA) has been prepared by DNV GL and was presented in the Brent Field Decommissioning Environmental Statement, supporting the Decommissioning Programmes.

Stakeholder engagement has been integral to the development of the Decommissioning Programme, and over the last 10 years the project has engaged with over 180 organisations, including: local and national environment groups, fishermen's associations, key government agencies, national and local government, industry bodies, academics and media. A detailed Stakeholder Report was submitted as part of the Public Consultation process.

Decommissioning Operations

The Brent Delta topside, weighing 24,200 tonnes, was successfully removed as a single piece by the Single Lift Vessel (SLV) *Pioneering Spirit*, in an operation that took about 2 days.

After securing the topside on the SLV, concrete caps were fitted onto the open end of each leg, with one of them pre-fitted with an Aid to Navigation (AtoN). The existing Consents to Locate will remain in force and the existing 500 m radius safety zones around the the gravity based structure (GBS) will remain in place.

This was the world's heaviest offshore lift, using the world's largest construction vessel.

The topside was carried on the *Pioneering Spirit* to the estuary of the River Tees, which is some 388 nautical miles (nm) from the Brent Field. As there is insufficient water depth at the Able UK's Seaton Port yard (ASP) facility for the *Pioneering Spirit* to moor alongside the quay, the topside was transferred to a specially constructed cargo barge *Iron Lady* at a designated nearshore transfer site approximately 5.5 nautical miles from the mouth of the River Tees. The barge was then towed by tugs to Quay 6 of the ASP facility on 2 May 2017 where it was moored with its stern to the quayside. The topside was subsequently skidded across the quay wall and then on to the demolition pad before finally being set-down using the topside support shoes from the barge.



Brent Delta Topside removal by *Pioneering Spirit*, April 2017.

Onshore dismantling has commenced to reduce the topside into its component materials or 'waste streams'. These will be 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 present topside inventory, it is planned to recycle at least 97% by mass of topside material which was returned to shore. All materials will be tracked from their present location to final destination.

Elsewhere in the field, all the Brent Bravo wells have been fully decommissioned, and permanent barriers have been set on over half of the Brent Alpha wells. Decommissioning of the Brent Charlie wells started in late 2017 and will continue for a number of years.

Brent Bravo topside preparations are underway, including the engineering scopes for the lifting points, platform strengthening and attic oil recovery. Activities are ongoing in 2018, as we move towards the anticipated goal of de-manning and lifting the Bravo topside in 2019.

In order to 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 is being undertaken by Shell to reconfigure the pipeline network. This project is referred to as the Brent Bypass Project (BBY). In Phase 1 completed in 2017, the NLGP (from the Magnus platform) and WLGP (from the Ninian Central platform) gas flows have been disconnected from the Brent Alpha platform and commingled at a new subsea NL-WL PLEM structure installed on the seabed to the west of the Brent Alpha platform, within the platform 500 m

zone. A new 1.6 km pipeline now transports the gas from the new NL-WL PLEM into the FLAGS pipeline south of the existing VASP structure.

A number of Brent Charlie Late Life projects were also completed in 2017 in order to improve the reliability and availability of the platform during the remaining life of the platform through end of production, plug and abandonment and decommissioning.

Other Decommissioning Activity

2017 has seen the start of decommissioning activities for Shell in the Central North Sea (CNS). In 2017, four subsea wells have been abandoned including two wells at Atlantic, one at Cromarty (on behalf of Hess) and one at Egret. Furthermore, Shell successfully trialled a low cost well head recovery using a supply vessel at Atlantic & Cromarty and Everest. The decommissioning activity in the Central North Sea is expected to rise significantly in the coming years.

In the Southern North Sea (SNS), Shell has taken the decision to remove the Leman BH platform and transfer all of its functions to Leman BT. This will optimise the offshore maintenance requirements and will not affect Leman field production. The Leman BH platform was removed using a reverse installation method which involved the removal of the bridge, topsides, bridge, and jacket using a Heavy Lift Vessel (HLV). The approximate weight of the platform is 1605 tonnes. The platform was the first to be delivered to the newly set up decommissioning facility in Great Yarmouth.



Brent Delta Topside Skidded onto Quay 6 ASP Facility Teesside, May 2017

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 external website at www.shell.co.uk

For further information, please call 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 (2013 - 2017)

	2013	2014	2015	2016	2017
Greenhouse Gas (GHG) (tonnes CO₂ equivalent)	2,424,984	2,335,621	2,593,723	2,743,723	2,571,161
Oil to Sea (tonnes) (discharged in produced water)	240	153	235	202	213
Hazardous Waste Generated (tonnes)	38,490	23,354	14,792	27,708	22,601
Non-Hazardous Waste Generated (tonnes)	53,456	29,992	33,704	17,088	14,281
Production Chemical Use (tonnes)	2,680	3,100	4,159	4,989	5,631
% Discharge	60	70	56	53	60
Wells Chemical Use (tonnes)	17,163	11,787	13,782	12,818	13,505
% Discharge	28	28	11	16	9

Data may have changed from previous years reports as revisions of the data can happen after the reports are 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 U.K. Environmental Emissions Monitoring System (EEMS).

APPENDIX 2

WELL ACTIVITIES IN 2017

Wells Drilled in 2017

Installation / Rig	Shell Well Name	Well Start Date	DECC Permit Reference
Noble Hans Deul	SW A5s2	01/11/2016	DRA/427
Noble Hans Deul	SW A8s2	20/04/2017	DRA/447

Wells Abandoned in 2017

Installation / Rig	Shell Well Name	Well Start Date	DECC Permit Reference
Noble Hans Deul	SW A4s1	30/07/2017	WIA/444
Brent Alpha	BA03	14/01/2017	WIA/463
Brent Alpha	BA12	30/01/2017	WIA/463
Brent Alpha	BA18	16/02/2017	WIA/463
Brent Alpha	BA11	13/03/2017	WIA/463
Brent Alpha	BA25	31/03/2017	WIA/463
Brent Alpha	BA26	13/04/2017	WIA/463
Brent Alpha	BA01	11/05/2017	WIA/463
Brent Alpha	BA15	30/05/2017	WIA/463
Brent Alpha	BA13	15/06/2017	WIA/463
Brent Alpha	BA27	25/06/2017	WIA/463
Brent Alpha	BA16	18/08/2017	WIA/463
Brent Alpha	BA17	19/09/2017	WIA/463
Brent Alpha	BA05	28/10/2017	WIA/463
Brent Alpha	BA10	29/11/2017	WIA/463
Brent Charlie	BC26	21/12/2017	WIA/471
Ocean Patriot	Atlantic A1Y	05/08/2017	WIA/549
Ocean Patriot	Atlantic A2z	03/08/2017	WIA/549
Ocean Patriot	Cromarty C6z	17/08/2017	WIA/559
Ocean Patriot	Egret P1	26/09/2017	WIA/566
Ocean Patriot	Bittern B4y	15/11/2017	WIA/548

APPENDIX 3

ABBREVIATIONS AND TERMINOLOGY

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 the equivalent global warming impact
DECC	Department of Energy and Climate Change
EEMS	Environmental Emissions Monitoring System (Oil & Gas U.K.)
EIA	Environmental Impact Assessment
ESOS	Energy Savings Opportunity Scheme
FPSO	Floating Production Storage and Offloading vessel
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
ISO14001	International Standard Specification for Environmental Management Systems.
NAI	Normally Attended Installation
NERC	Natural Environmental Research Council
Nm	Nautical Miles
NUI	Normally Unattended Installation
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 www.og.berr.gov.uk/regulation/pons/index.htm
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

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 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 dividends 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, 2017 (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, 2018. 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.

