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**DEA UK**

**Environmental Report 2014**



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**2014 Environmental Report**

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**Glossary**

<b>Centrica</b>	Centrica Energy Upstream
<b>CMS</b>	Caister Murdoch System
<b>DECC</b>	Department of Energy and Climate Change
<b>Enesco</b>	Enesco plc
<b>EMS</b>	Environmental Management System
<b>HQ</b>	Hazard quotient
<b>HS&amp;EMS</b>	Health Safety & Environment Management System
<b>ISO</b>	International Standards Organisation
<b>NMVOC</b>	Non-methane volatile organic compounds
<b>NUI</b>	Normally unattended installation
<b>OCNS</b>	Offshore Chemical Notification Scheme
<b>OCR</b>	Offshore Chemicals Regulations 2002
<b>OPEP</b>	Oil Pollution Emergency Plan
<b>OSPAR</b>	Oslo Paris convention for the protection of the marine environment of the NE Atlantic
<b>PLONOR</b>	Pose Little Or No Risk
<b>PON15</b>	Petroleum Operations Notice 15
<b>POSA</b>	Processing and operating services agreement
<b>ppm</b>	Parts per million
<b>RDUK</b>	RWE Dea UK
<b>SNS</b>	Southern North Sea
<b>TGT</b>	Theddlethorpe Gas Terminal
<b>UKCS</b>	UK continental shelf
<b>VOC</b>	Volatile Organic Compounds

## 1 Introduction

This document is the 2014 Environmental Report for RWE Dea UK SNS Limited ('RDUK').

In March 2015 the company name changed to DEA UK SNS Limited ('DEA UK'). This document has been produced under the new company name of DEA UK, but describes the activities undertaken by RDUK, who was the licenced operator during 2014.

It should be noted that, other than the name change, the operational business management system, including the HSE management system, has remained unchanged and is referred to both in the current tense (as operated by DEA UK), and in the past tense (as operated when the organisation was called RWE Dea UK SNS Limited).

This report is a public statement designed to:

- Identify RDUK and define the scope of its offshore activities;
- Summarise RDUK's Environmental Management System (EMS);
- State RDUK's environmental policy, goals, objectives and targets; and
- Provide a performance summary for 2014.

RDUK had a combined Health, Safety & Environment Management System (HS&EMS) in place since its inception in 2002, and the same system is in place within DEA UK.

In November 2010 RDUK was awarded ISO 14001 certification by DNV. Since then, RDUK's HS&EMS has been the subject of biannual surveillance audits, each of which has resulted in the successful re-approval of the certification. The certificate covers the management of all RDUK exploration, drilling, development and production operations. The system was re-certified in October 2014.

This document is the ninth annual RDUK Environmental Report to be issued as a public statement.

Following on from the above introduction, the remainder of this document comprises the following four Sections:

**Section 2 - RDUK Scope of Activities:** Provides details of RDUK and the scope of its offshore activities during 2014.

**Section 3 - EMS Summary:** Provides a brief description of the RDUK EMS.

**Section 4 - Environmental Policy:** Provides a brief description of the RDUK environmental policy, including the relevant environmental goals, objectives and targets that were established for significant environmental aspects and impacts.

**Section 5 - Performance Summary:** Provides a summary of performance in relation to the environmental policy, goals, objectives, targets and any relevant legislative requirements.

## 2 Scope of RDUK Activities

This Section identifies RDUK, as it operated during 2014, and describes the scope of RDUK's activities during the reporting period.

### 2.1 Overview

#### 2.1.1 RWE Dea AG

RWE Dea AG, headquartered in Hamburg Germany, managed the upstream activities of the oil and gas business of the RWE Group. The RWE Group is headquartered in Essen, Germany, and is one of Europe's largest energy utilities.

During 2014 RWE Dea AG's activities included the exploration for, and the development/production of, oil and gas in Germany, the UK, Norway, Denmark and Egypt. Additionally, RWE Dea AG undertook exploration activities in Algeria, Ireland, Libya, Mauritania, Poland, Turkmenistan and Trinidad and Tobago.

In Germany RWE Dea AG also operated subterranean storage facilities for natural gas.

#### 2.1.2 RWE Dea UK

RWE Dea UK (RDUK) was the UK operating subsidiary of RWE Dea AG. RDUK maintained production, development, and exploration activities on the UKCS (UK Continental Shelf). RDUK was awarded exploration licences in the 20<sup>th</sup>, 21<sup>st</sup>, 22<sup>nd</sup>, 23<sup>rd</sup>, 24<sup>th</sup>, 25<sup>th</sup>, 26<sup>th</sup> and 27<sup>th</sup> UK licensing rounds, some of them as operator.

During 2014, RDUK's principal producing interests were the RDUK operated Windermere, Cavendish, Topaz, Clipper South and Breagh southern North Sea (SNS) gas fields.

During 2014 non-operated production interests included the Victor, Anglia, Markham, Saturn, Mimas, Tethys and Minke SNS gas fields. Other non-operated interests included the Devenick gas condensate field located in the central North Sea and the UK-Dutch cross border development of the Orca Unit gas field (in the southern north sea), as well as partnership in a range of exploration licences in the southern, central and northern North Sea.

The environmental performance associated with the production and development activities at the non-operated fields referenced above is outwith the scope of this report and will be detailed in separate public statements produced by the respective operators.

RDUK, and now DEA UK's, head office is located at the below address:

4<sup>th</sup> floor  
90 High Holborn  
London WC1V 6LJ  
Tel: 020 3116 0200  
Fax: 020 3116 0205

## 2.2 RDUK offshore activities during 2014

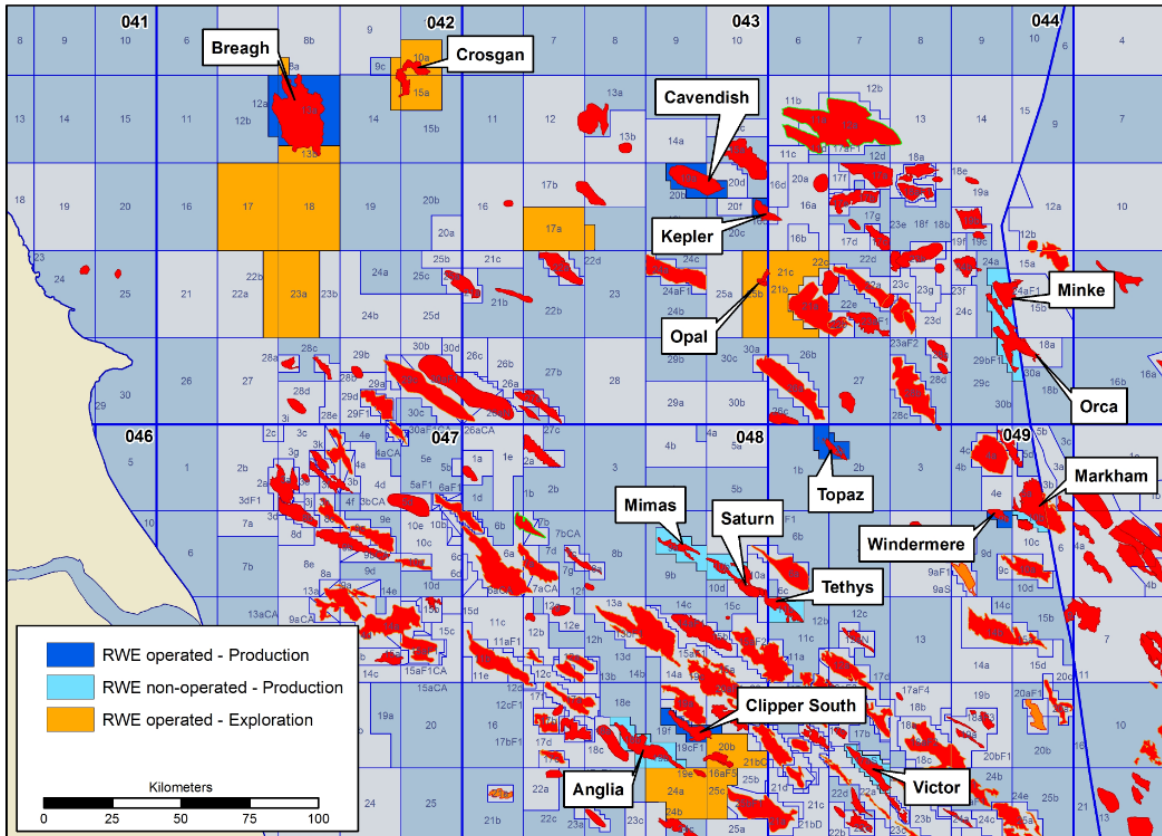
RDUK’s offshore activities during 2014 have been grouped into the following two categories for discussion in both the remainder of this Section and in the Performance Summary provided in Section 5:

- Production (Windermere, Cavendish, Topaz, Clipper South and Breagh); and
- Drilling and Fracturing (Breagh, Clipper South and Crosgan Well).

### 2.2.1 Production Operations

RDUK production operations during 2014 included assets at Windermere, Cavendish, Topaz, Breagh and Clipper South fields. The location of the fields that produced in 2014 is shown in Figure 2.1 below.

Figure 2-1 RDUK Operated Producing Fields During 2014



#### 2.2.1.1 Windermere

The Windermere platform, pictured below, is a gas producing normally unattended installation (NUI) located in SNS Block 49/09b. The platform is tied back via a 7 kilometre long 8-inch pipeline to the Centrica Energy Upstream (Centrica) operated ST-1 platform that is part of the Markham field complex. The Windermere platform is a fixed three-legged jacket that is visited on a routine basis to undertake maintenance operations. The Windermere topside facilities enable primary operational control from Centrica’s J6-A platform. The ST-1 platform is tied back

to the J6-A platform which is located in the Dutch sector and is the main hub of the Markham field complex. Incoming gas supplies are commingled at J6-A before being landed onshore in the Netherlands.



RWE Dea UK SNS Limited<sup>1</sup> was the licensed operator of the Windermere field on behalf of the field owners during 2014 (RWE Dea UK SNS Limited 60 percent, Noble Energy (Europe) Limited 20 percent and Centrica North Sea Gas Limited 20 percent).

The Windermere platform is controlled, operated and maintained for production purposes by Centrica. Although an operator in their own right, in this instance, Centrica acts as a contractor and are responsible for day to day production operations at Windermere. In a Processing and Operating Services Agreement (POSA), Centrica were contracted by RWE Dea UK SNS Limited to provide processing and operating services.

Tasks such as wireline operations, well intervention, drilling and workovers were planned and managed directly by RDUK.

During 2014, 9,161,965 Nm<sup>3</sup> of gas and 515 tonnes of condensate were produced via the Windermere platform.

#### 2.2.1.2 Cavendish

The Cavendish platform is a gas and condensate producing NUI located in SNS Block 43/19a. The platform is tied back via a 47 kilometre long 10-inch pipeline to the ConocoPhillips operated Murdoch host platform. The Cavendish platform is a fixed four-legged jacket that is visited on a routine basis to undertake maintenance operations. The Cavendish topsides facilities enable primary operational control from the Murdoch platform. The Murdoch platform is the main hub of the Caister Murdoch System (CMS). Incoming gas supplies are commingled at Murdoch before being landed onshore in the UK, via the CMS trunk line, at the Theddlethorpe Gas Terminal (TGT).

RWE Dea UK SNS Limited was the licensed operator of the Cavendish field on behalf of the field owners in 2014 (RWE Dea UK SNS Limited 50 percent and Dana Petroleum (E&P) Limited 50 percent).



The Cavendish platform was controlled, operated and maintained for production purposes by RDUK, with the assistance of an offshore support contractor (ODE Ltd). In a services support role, ODE Limited provides resources to maintain the facilities. Tasks such as wireline

<sup>1</sup> RWE Dea UK SNS Limited was a 100 percent subsidiary of RDUK Holdings Limited.



operations, well intervention, drilling and workovers were planned and managed directly by RWE Dea UK SNS Limited, using other contractors.

During 2014, 112,351,088 Nm<sup>3</sup> of gas and 217 tonnes of condensate were produced via the Cavendish platform.

#### 2.2.1.3 Topaz

The Topaz subsea well head and protective structure, pictured below during installation, is a gas producing seabed installation located in SNS Block 49/02a. The facility is tied back to the Schooner host platform via a 15.2 kilometre long 6-inch gas export line, with associated methanol feed line and control and communications cable. The Schooner platform is itself tied back to the Murdoch platform described above. Schooner was owned and operated during the first part of 2014 by Tullow Oil SK Limited, however, it was operatorship transferred in October 2014 to Faroe Petroleum (UK) Limited.



RWE Dea UK SNS Limited was the licensed operator of the Topaz field on behalf of the field owners in 2014 (RWE Dea UK SNS Limited 57.5 percent, Ithaca Energy (UK) Limited with 35 percent and Faroe Petroleum (UK) Limited 7.5 percent).

The Topaz subsea production facility is controlled, operated and maintained for production purposes remotely from Faroe's Schooner platform. Faroe has a contract in place with Petrofac Ltd., the Duty Holder and day to day operator of the Schooner platform.

During 2014, 6,335 Nm<sup>3</sup> of gas and 549 tonnes of condensate were produced via the Topaz production facility.

#### 2.2.1.4 Clipper South

Production operations commenced at the Clipper South platform in August 2012. The Clipper South platform is located in SNS Block 48/19, approximately 100km due east of the Theddlethorpe gas terminal, in a water depth of 23.5m.

The drilling programme commenced in early 2012 at the Clipper South location. The first well was drilled, the reservoir fractured, and well brought into production in Aug 2012. Following this, a further three wells were drilled at the location (the drilling programme continued into early



2013). Following departure of the drilling rig in 2013, the second, third and fourth wells were fractured.

During the initial stages of Clipper South production, an operations team has been continuously on board to operate and maintain the facility, commission subsequent wells and perform routine removal of accumulated proppant from the wellhead cyclones. They were present throughout 2014.

RWE Dea UK SNS Limited was the licenced operator of the Clipper South field on behalf of the field owners in 2014 (RWE Dea UK SNS Limited 50 percent, Fairfield Acer Limited 24 percent, Bayerngas Europe Limited 25 percent and Fairfield Cedrus Limited 1 percent).

During 2014, 618,793,074 Nm<sup>3</sup> of gas and 9,773 tonnes of condensate were produced via the Clipper South platform.

#### 2.2.1.5 Breagh



The Breagh A platform is located in SNS Block 42/13a in a water depth of 62m. After being installed in late 2011, drilling activities commenced in Q2 2012, continued throughout 2013 and were completed in 2014. Production commenced from the platform in October 2013. As drilling is now completed, the platform is operated as a NUI, typically for periods of between 60-100 days in between maintenance visits.

The 20-inch gas export line and 3-inch monoethylene glycol (MEG) line between the Breagh A platform and the landfall at Redcar that had remained filled with inhibited seawater throughout 2012 were dewatered and commissioned in 2013. The offshore pipelines and fibre optic cable are some 100km long. Construction of the onshore terminal in Teesside was completed in 2013 allowing the start of production from Breagh.

The Breagh platform produced 1,132,531,884 Nm<sup>3</sup> of gas and 9,079 tonnes of condensate in 2014.

### 2.2.2 Drilling and Fracturing

#### 2.2.2.1 Breagh

The final well to be drilled in this campaign was completed at Breagh in September 2014 and the rig left the NUI in October.

#### 2.2.2.2 Clipper South

Although drilling at Clipper South was completed in 2013, fracturing continued into 2014. These operations were undertaken from the platform with the support of a specialist vessel. C4 was fractured and completed in March 2014.



2.2.2.3 Crosgan Well

After departing the Breagh platform, an exploration well was drilled at the Crosgan location in Block 42/15a by the Ensco 70 MODU. Drilling commenced in December 2014 and was not completed until February 2015. Further details regarding the Crosgan well will be provided in the 2015 Environmental Report.

### 3 EMS Summary

This Section provides a brief description of RDUK's EMS as it operated in 2014.

#### 3.1 Introduction

The EMS is a component the overall Business Management System (BMS) that defines the organisational structure, planning activities, responsibilities, procedures, business processes and resources required for developing, implementing, achieving, reviewing and maintaining the environmental policy.

The RDUK (and now the DEA) EMS is a tool for identifying and managing the impact the business has on the environment. The EMS works to reduce this impact by controlling the quantity of materials and energy used and the amount of waste produced. As well as facilitating the management of environmental impacts in a credible way, the EMS provides a practical tool to help evaluate and improve performance in a verifiable way.

The following guiding principles and methodologies are incorporated into the OSPAR Strategy and integrated, as appropriate, into the EMS:

- the precautionary principle;
- the polluter pays principle;
- best available techniques and best environmental practice, including, where appropriate, clean technology;
- sustainable development;
- the application of an integrated ecosystem approach; and
- the waste management hierarchy of avoidance, reduction, re-use, recycling, recovery, and residue disposal.

#### 3.2 Verification

RDUK (and now DEA UK) have had an HS&EMS in place since 2002. In order to demonstrate conformity with the EMS requirements set out in OSPAR Recommendation 2003/5<sup>2</sup> and the OSPAR Offshore Strategy<sup>3</sup>, independent verification of the EMS was initially gained in September 2006. Following on from this, a second independent verification of the EMS was successfully completed in August 2008, to cover the 2008 to 2010 period. In both instances, verification was carried out by an independent and accredited third party certification body possessing recognised competence in the area. In November 2010, the EMS was awarded ISO 14001 certification by DNV, an independent and accredited third party certification body possessing recognised competence in this field.

Since the initial certification, the HS&EMS has been subject to biannual reviews, each of which has resulted in the successful re-approval of the certification. The ISO 14001 certification covers the management of all the company's exploration, drilling, development and production operations and was successfully re-certified in October 2014.

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<sup>2</sup> OSPAR Recommendation 2003/5 - to Promote the Use and Implementation of Environmental Management Systems by the Offshore Industry. Meeting of the OSPAR commission; Bremen: 23-27 June 2003

<sup>3</sup> OSPAR Strategy on Environmental Goals and Management Mechanisms for Offshore Activities ("Offshore Strategy"-OSPAR Reference Number 2003-21) available on the OSPAR website <http://www.ospar.org/>

### 3.3 Review

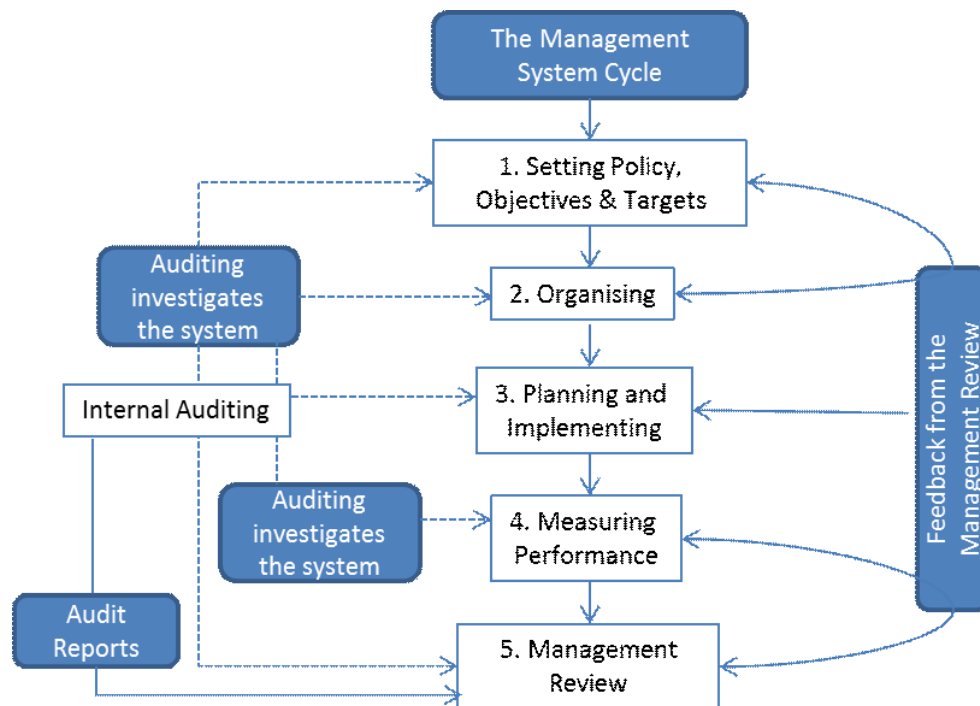
In order to assess the adequacy and suitability of the HS&EMS, internal system reviews have been conducted in 2005 and 2008 (RDUK references RD-COR-SRT005 and RD-COR-SRT011 respectively). The HS&EMS was again subject to review as part of the ISO 14001 certification process during 2010 and 2014.

In addition, a formal review of performance is conducted annually. This is an essential step required to assess the effectiveness of the HS&EMS in achieving the aims of the company's policy and objectives and to achieve continuous improvement in the control system.

The review process enables the company to:

- review progress against existing objectives and targets;
- consider evidence of performance, such as audits and other reports;
- consider the sufficiency of the organisational structure, the available resources, the policy and the management system in general; and
- agree new objectives and targets.

The Management System review process is illustrated in the figure below.



Internal auditing is used to objectively investigate how each element of the management system is being applied. Internal audit reports provide input to management review, along with other performance indicators.

## 4 Environmental Policy

This Section provides a brief description of the company's environmental policy, including relevant environmental goals, objectives and targets set for significant environmental aspects and impacts.

### 4.1 Introduction

With regard to the setting of environmental goals and the establishment of improved management mechanisms to achieve them, an objective of the OSPAR Commission is to:

*'Prevent and eliminate pollution and take the necessary measures to protect the maritime area against the adverse effects of offshore activities so as to safeguard human health and to conserve marine ecosystems'*.

In terms of pollution of the marine environment, the OSPAR Strategy has identified the following offshore activities as being of greatest concern which could include;

- the use and discharge of Hazardous Substances<sup>4</sup>;
- the discharges of oil and other chemicals in water and from well operations;
- emissions of substances likely to pollute the air;
- flaring; and
- the disposal of naturally occurring radioactive material (NORM) in the form of low specific activity radioactive scales and sludge.

In line with the OSPAR Strategy, the company has established an environmental goal of protecting and conserving the maritime area against any potentially adverse effects resulting from its activities. To achieve this goal, programmes and measures to identify, prioritise, monitor and prevent/reduce/eliminate any emissions, discharges or losses of substances which could cause pollution have been developed.

Non-polluting activities, that may have potentially adverse effects on the ecosystems and biological diversity of the maritime area, include exploration activities and the installation of structures, cables and pipelines.

### 4.2 HS&E Policy Statement

The components of the HS&E Policy Statement that relate to environmental management are stated in the remainder of this Section.

The Company operates in a sensitive environment and takes a proactive stance in the protection of the environment, recognising its moral and legal obligations to conduct all activities in a manner which protects the natural environment.

HS&E management is a prime responsibility of line management from the most senior executive to supervisory level. All employees are required to act responsibly so as to protect the environment.

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<sup>4</sup> Substances or groups of substances that are toxic, persistent and/or liable to bioaccumulate, or which give rise to an equivalent level of concern.

In relation to environmental management, DEA UK will:

- annually set and internally publish objectives, seeking to achieve improvement wherever practicable;
- document procedures for management, based on recognised standards which clearly allocate responsibilities within the HS&EMS;
- provide and maintain clear lines of communication and consult with employees to ensure awareness and gain commitment to the policy and the company's procedures for its implementation;
- ensure that all employees are competent to discharge their relevant responsibilities and receive all necessary information, instruction and training;
- monitor and record performance, and conduct internal audits;
- annually conduct a management review of performance against objectives, including review and development of policy and the HS&EMS; and
- ensure that sufficient resources are provided and allocated to implement the policy.

For all its activities and projects undertaken, DEA will:

- comply, as a minimum, with all environmental legislation applicable in the UK, applying best industry practice and undertaking steps to improve environmental protection levels where appropriate;
- plan for the management of environmental issues, identifying performance standards, procedures for control and monitoring, and resources to be applied;
- ensure that systematic hazard identification, assessment of the risk of harm and incorporation of measures to control risks are central to the design, construction and operation of facilities;
- select competent contractors and provide them with all necessary information, including definition of HS&E requirements;
- monitor and audit contractors to ensure that they operate in compliance with the principles of DEA's Policy and meet the standards required; and
- maintain emergency and contingency plans.

DEA requires each of its contractors and suppliers to:

- operate an effective EMS relevant to their scope of work/supply; and
- comply with DEA's environmental requirements including appropriate planning, hazard identification, risk control, performance monitoring and reporting.

### 4.3 Objectives and targets for 2014

The environmental management objectives and targets for the period between January and December 2014 were set out in an RDUK document entitled *Objectives and Targets for QHSE Management (2014)* (Reference: RD-COR-BOT014-1). The objectives were determined in order to progressively achieve the commitments set out in the HSE Policy Statement. The relevant environmental objectives and targets for 2014 are set-out in the next section in Table 5.1 along with the associated progress status.

## 5 Performance Summary

This Section provides a summary of performance in relation to compliance with relevant legislative requirements and compliance with the RDUK (and now DEA) environmental policy, goals, objectives and targets. A summary of offshore environmental aspects, and their associated emissions and impacts, is also provided.

### 5.1 Introduction

RDUK’s internal and external auditing processes enabled reporting on the areas of environmental performance defined in Section 4, i.e. the extent to which the environmental goals listed below have been achieved:

- compliance with legislation;
- progress made in achieving environmental goals; and
- continual improvement in environmental performance.

The HS&E management review for 2014 was completed by the Head of QHSE in February 2015. The findings were presented to senior management and the accompanying report, entitled *QHSE Annual Report for Year 2014 (Reference: RD-COR-BRT014-2)*, was subsequently approved by the Managing Director (Feb 2015).

### 5.2 2014 Environmental Performance Summary

Progress against the items identified in *Objectives and Targets for HS&E Management 2014* is shown in Table 5.1 below.

**Table 5-1 HSE Objectives and Targets Relating to Environmental Performance During 2014**

<b>EMS development</b>	
Maintain and develop Emergency Response arrangements suitable for all current operated facilities, revising the Emergency Response Manual.	Achieved
<b>Risk management</b>	
Ensure timely close-out of HS&E actions in QHSE Actions Register <sup>5</sup>	Achieved
<b>Training</b>	
Ensure all London office personnel are given office H&S induction training within 1 month of starting.	Achieved
Maintain training for oil spill response to DECC standards and conduct oil spill response exercises	Achieved
Conduct an emergency response exercise with ERT and others – for a major safety incident scenario.	Achieved
<b>Operated Installations</b>	
Ensure approved Oil Pollution Emergency Plans are in place for each operated installation – for standalone production operations and for COMOPS with drill rig, where applicable.	Achieved
Create Environmental Management Plans for each operated installation, including environmentally critical elements.	Achieved

<sup>5</sup> Target maximum 10% overdue actions, quarterly.



Environmental incidents	
Total Reportable Incident Frequency <sup>6</sup> < 1.0 per 100,000 exposure hours worked	TRIF 0.14 per 10 <sup>5</sup> manhours
Target zero reportable oil/chemical spillage incidents to sea or land.	Achieved
Target zero unplanned hydrocarbon releases offshore from operating installations	Achieved
Target zero reportable non-compliances with environmental permit conditions	Achieved
Zero reportable incidents for office-based RDUK activities	Achieved
Audit and Review	
Ensure that a programme of sufficient audits and reviews across HS&E activities is completed during 2014.	17 Planned, 13 Achieved
Prepare and publish Annual Environmental Report for 2013	Achieved

In the following Sections, RDUK's environmental performance is assessed against the following two categories of offshore activity (as utilised in Section 2):

- Production (Windermere, Cavendish, Topaz, Clipper South and Breagh)
- Drilling and Fracturing (Breagh<sup>7</sup> and Clipper South)

### 5.2.1 Production Activities

RDUK production operations during 2014 were undertaken at the Breagh, Clipper South, Cavendish, Topaz and Windermere fields.

#### 5.2.1.1 Chemical use and discharge

##### Windermere

For the Windermere facilities, production chemicals are supplied in an umbilical that is routed from the nearby ST-1 platform and remain in a closed production system that is processed at J6-A located in the Dutch sector. As such, no overboard discharges of production chemicals occurred at the Windermere platform. The use of the chemicals within the production system on Windermere does not require permitting under the Offshore Chemical Regulations 2002 (as amended 2011).

##### Cavendish

For the Cavendish facilities, production chemicals are supplied via Murdoch and remain in a closed system that originates and terminates onshore at TGT. As such, the use of these chemicals does not require permitting under the Offshore Chemical Regulations 2002 (as amended 2011). However, to accommodate the need for helideck cleaning on Cavendish, a Chemical Permit is in place for this operation and to cover well 'soak' operations. During 2014, Cavendish operations used and discharged 136kg of SOBO S GOLD 08 as a consequence of helideck cleaning. The well 'soak' operations utilised 0.704kg of Ascorbic Acid, which was retained within the production system, and therefore, there were no overboard discharges of this product.

##### Topaz

During 2014 up to a maximum of 25kg of Castrol Transaqua HT2, a water-based hydraulic fluid with an Offshore Chemical Notification Scheme (OCNS) category D ranking, was discharged via

<sup>6</sup> For all reportable safety and environmental incidents.

<sup>7</sup> Grogan well will be covered in Environmental Report 2015.

the Topaz subsea well. The use and discharge of this product is permitted under the OCR on the Chemical Permit for the Faroe Petroleum (UK) Limited operated Schooner platform.

#### Clipper South

During 2014, Clipper South operations used and discharged 458kg of SOBO S Gold 08 rigwash detergent (for platform cleaning). No other chemicals were used or discharged.

#### Breagh

During 2014, Breagh operations used chemicals in order to undertake well start-up operations and for general platform cleaning operations. The chemical use in 2014 was

- 7,145kg use of Methanol (Clariant) gas hydrate inhibitor;
- 14,084kg use of Methanol (and all dilutions) (REDA) gas hydrate inhibitor;
- 25kg use and discharge of SOBO S Gold 08 (Oil Technics Ltd) detergent / cleaning fluid.

The methanol remained within the production system and therefore was not discharged to sea at the platform.

#### 5.2.1.2 Produced water discharges

There are no produced water, or other, discharges to sea at the Windermere platform; since May 2013 all produced water from J6-A has been re-injected. Due to several produced fluid streams arriving at J6-A, separate measurement of hydrocarbons originating from Windermere is not made.

The Cavendish, Topaz, Clipper South and Breagh developments utilise closed production systems and there are no separation facilities or disposal caissons at these installations. As such, there are no offshore discharges of produced water associated with production operations at Cavendish, Breagh, Clipper South or Topaz.

#### 5.2.1.3 Waste

A total of 2.12 tonnes of waste was generated at the Windermere platform during 2014. A total of 4.58 tonnes of waste was generated at the Cavendish platform during 2014. The Clipper South platform generated 92.9 tonnes of waste in 2014 and Breagh generated 1.49 tonnes of waste in 2014. A summary of the wastes produced from operational assets is provided as Table 5-2 below.

**Table 5-2 Summary of Waste from Production Operations (tonnes), 2014**

Asset	Group	Type	Reuse	Re-cycling	Waste to Energy	Incinerate	Landfill	Total
Cavendish	Group I	Chems/ Paints	-	0.002	-	-	0.1	<b>0.1</b>
		Oils	-	-	1.0	-	-	<b>1.0</b>
		Misc	-	-	0.075	-	-	<b>0.075</b>
	Group II	Drums / Containers	-	0.023	-	-	-	-
		Scrap Metal	-	0.04	-	-	-	-
		Seg. Recyclables	-	1.34	-	-	0.03	<b>1.37</b>
		General	-	-	-	-	1.97	<b>1.97</b>
Clipper South	Group I	Chems/ Paints	-	0.041	0.075	-	0.107	<b>0.22</b>
		Drums / Containers	-	0.84	-	-	-	<b>0.84</b>
		Oils	-	-	7.76	-	-	<b>7.76</b>
		Misc	-	0.103	2.329	-	-	<b>2.43</b>
		Sludges/ Liquids/ Tank Washings	-	-	34.37	-	-	<b>34.37</b>
	Group II	Drums / Containers	-	0.526	-	-	-	<b>0.53</b>
		Scrap Metal	-	11.372	-	-	-	<b>11.37</b>
		Seg. Recyclables	-	14.17	0.6	-	-	<b>14.77</b>
		General	-	-	-	-	20.6	<b>20.6</b>
	Group III	Clinical	-	-	-	0.01	-	<b>0.01</b>
	Breagh	Group I	Chems/ Paints	-	-	0.1	-	-
Group II		Drums / Containers	-	0.04	-	-	-	<b>0.04</b>
		Seg. Recyclables	-	1.04	-	-	-	<b>1.04</b>
		General	-	-	-	-	0.31	<b>0.31</b>
Windermere	Group II	Scrap Metal	-	0.3	-	-	-	<b>0.3</b>
		Seg. Recyclables	-	0.22	-	-	-	<b>0.22</b>
		General	-	-	1.6	-	-	<b>1.6</b>
<b>Total</b>			<b>0</b>	<b>30.06</b>	<b>47.91</b>	<b>0.01</b>	<b>23.14</b>	<b>101.1</b>

In addition to the above wastes, the liquid waste generated at the Breagh, Cavendish, Windermere and Schooner<sup>8</sup> platforms during routine maintenance visits by the contracted flying squads was limited to small volumes of wastewater, from the sink and shower, as well as sewage from the single toilets, which was discharged to sea. The Clipper South platform has a macerator for all black waste. The small amounts of domestic waste generated during NUI visits is bagged and returned onshore. RDUK and DEA policy states that no garbage, including plastic, is to be disposed of overboard.

<sup>8</sup> Waste that is applicable to the Topaz subsea tieback.

5.2.1.4 Atmospheric emissions

The Cavendish, Clipper South and Breagh platforms have self-sufficient power supplies in the form of standalone diesel generators. The Windermere facility is provided with power via a subsea electrical cable from the ST-1 facility. Operational emissions to air from combustion of diesel to power generators is summarised in Table 5-3 below. It is of note that diesel consumption at Clipper South includes additional energy requirements from the C4 completion operations which ended in March 2014.

**Table 5-3 Emissions to Air from Producing Assets (tonnes), 2014**

Asset	Diesel Used	Emissions to Air						
		CO <sub>2</sub>	CO	NO <sub>x</sub>	N <sub>2</sub> O	SO <sub>2</sub>	CH <sub>4</sub>	VOC
Cavendish	38.15	122	0.6	2	0.01	0.15	0.01	0.08
Clipper South	266.15	852	4.2	16	0.06	1.06	0.05	0.53
Breagh	82.74	265	1.3	5	0.02	0.33	0.01	0.17

Atmospheric emissions relating to production operations at the Clipper South, Breagh, Cavendish and Windermere fields were also generated as a result of the combustion of fuel onboard the helicopters and supply/standby vessels utilised during planned maintenance visits.

In addition to the above, emissions to air from operational facilities emanated from the manual venting of produced gas for maintenance purposes. The calculated emissions of direct gas from operational facilities in 2014 comprised the following from maintenance venting:

- Breagh – 2.55 tonnes
- Cavendish – 0.14 tonnes
- Clipper South – 3.54 tonnes
- Windermere – 0 tonnes

5.2.1.5 Oil spills

RDUK had Oil Pollution Emergency Plans (OPEP's) in place to cover all production operations at Cavendish, Windermere, Breagh and Clipper South during 2014. Previously, the spill arrangements for the Topaz subsea facility were detailed within an Addendum of Tullow Oil's OPEP for the Schooner platform, however, since August 2014 Topaz production has been covered under a standalone OPEP. Each OPEP lists the required offshore and onshore actions and responses, defines roles and responsibilities in the event of an oil spill and provides a risk assessment.

No oil spills occurred at, or in association with, any of the RDUK production operations during 2014.

**5.2.2 Drilling and Fracturing**

RDUK's drilling operations during 2014 comprised the completion of drilling of production wells at the Breagh platform by the Ensco 70 MODU. The drilling rig then relocated to Crosgan to drill an appraisal well which commenced in December. Standalone fracturing operations and clean-up of well C4 occurred at Clipper South using a stimulation vessel alongside the platform.

**5.2.2.1 Chemical use and discharge**

In compliance with the OCR, chemical permits were approved by DECC and maintained throughout all well operations. A record of chemical use and discharge during the course of all operations covered by the chemical permit was maintained. All applicable chemicals used in conjunction with well operations were approved for offshore use under the OCNS. The total amounts of chemicals used and discharged during operations at Breagh A7 and A8 and during fracturing at C4 in 2014 are shown in Table 5-4 below. Chemical use at Crosgan will be detailed in the 2015 report.

**Table 5-4 Chemical Use and Discharge During Drilling Operations (tonnes) in 2014**

Risk level	Justification for assigned risk level	Used	Discharged
Environmentally benign	PLONOR listed <sup>9</sup>	1,909	1,186
Low risk	No SUB warning	667	88
Increased risk	No SUB warning, however, chemical has other warnings (e.g. heavy metals)	0.0008	0
Substitution Warning	Substitution warning is in place	831	131
<b>Total</b>		<b>3,407</b>	<b>1,405</b>

Qualitative and quantitative risk assessments relating to the use and discharge of each of these products were provided in the respective chemical permit applications. A description of the replacement strategies the suppliers are employing will be provided in RDUKs Technical Justification Report provided to DECC.

**5.2.2.2 Waste**

Prior to the commencement of drilling activities, RDUK ensured that Garbage Management Plans were in place for the Ensco 70. Ensco is responsible for ensuring compliance with all waste disposal licences and waste transfer documentation requirements for scrap metal and non-hazardous waste. Reuse or recycling is the preferred option. RDUK (and DEA UK) policy states that no garbage, including plastics, are to be disposed overboard. Only macerated food waste and sewage is discharged.

Drilling activities at the Breagh development resulted in the 1,372 tonnes of discharges of cuttings (from water based mud drilling only) overboard in 2014. This is from the A7 and A8 wells.

OBM and cuttings were back-loaded to shore where the majority of the OBM is recycled. A summary of wastes generated from drilling OBM sections (muds and cuttings) is provided in Table 5-5 below.

**Table 5-5 Summary of Drilling Related Wastes (from oil based mud sections) (tonnes), 2014**

Type		Recycling	Landfill	Other
Hazardous	Solids	-	103.06	-
	Oil	12.44	-	-
	Water	-	-	39.59

<sup>9</sup> PLONOR listed products are considered to Pose Little Or No Risk to the environment.

5.2.2.3 Atmospheric emissions

The drilling of A7 and A8 resulted in the combustion of 1,888 tonnes of diesel on the Ensco 70 in 2014. In addition, flaring activities were undertaken as part of well clean-up and testing activities. This resulted in 9,435 tonnes of gas being flared on the Ensco 70. Well clean-up and testing of C4 at Clipper South resulted in 1,690 tonnes of gas being combusted. Diesel consumption is considered in section 5.2.1.4.

These figures resulted in the following calculated emissions to air.

**Table 5-6 Summary of Emissions to Air from Drilling and Well Clean-up Activities (tonnes) in 2014**

	CO <sub>2</sub>	CH <sub>4</sub>	NM VOC	SO <sub>2</sub>	NO <sub>x</sub>
Power Gen	6,042	0.34	3.78	7.55	112
Flaring	35,600	2	22.25	44.5	661
<b>Total</b>	<b>41,642</b>	<b>2.34</b>	<b>26.03</b>	<b>52.05</b>	<b>773</b>

In addition to the above, various supply boats, standby vessels, tugs and helicopters were used in association with well operations during 2014. A quantity of diesel would have been combusted onboard the support vessels, adding a relatively small fraction to the atmospheric emissions identified above.

5.2.2.4 Oily water discharges and Oil Spills

During well clean-up activities at Breagh a total of 2.5kg of hydrocarbons were discharged to sea, within 468m<sup>3</sup> of total fluids during 2014, under the Offshore Petroleum Activities (Oil Pollution Prevention and Control) Regulations 2005. Well clean-up activities at the C4 well at Clipper South required that 0.6kg of hydrocarbons were discharged to sea within 361m<sup>3</sup> of total fluids.

In accordance with MARPOL 73/78 Annex 1, oily drainage water generated onboard the Ensco 70 drilling rig and the contracted support vessels, was collected and treated to provide an effluent with a maximum oil in water content of 15 ppm.

All drilling operations had dedicated Oil Pollution Emergency Plans throughout 2014 listing the required offshore and onshore actions and responses, defined role and responsibilities in the event of an oil spill, risk assessment and outline relief well drilling plans in the event of a blowout.