

Dana Petroleum UKCS Environmental Statement 2016



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Abbreviations

BEIS – Department for Business, Energy & Industrial Strategy

DECC- Department of Energy and Climate Change

EMS- Environmental Management System

FPSO- Floating, Production, Storage and Offloading

GGA- Greater Guillemot Area

HSSE- Health, Safety, Security and Environment

Km- kilometres

NDC- North Drill Centre

ODMS- One Dana Management System

OPRED- Offshore Petroleum Regulator for Environment and Decommissioning

SDC- South Drill Centre

UK- United Kingdom

Introduction

This statement describes the 2016 environmental performance of Dana Petroleum (E&P) Limited's UK offshore oil and gas operations. It has been prepared to satisfy the requirements of OSPAR Recommendation 2003/5 and the associated Offshore Petroleum Regulator for Environment and Decommissioning (OPRED) guidance (OSPAR 2003/5 Department of Energy and Climate Change (DECC) Guidance: Rev 5 May 2014).

Dana, a wholly owned subsidiary of the Korea National Oil Corporation, operates internationally with offices in the UK, Egypt and the Netherlands. In the North Sea, Dana operates two assets as well as being a partner in several non-operated ventures. In 2016, Dana also continued drilling operations for its forthcoming Western Isles development.

One of Dana's key values is to respect the environment and work to minimise the impact of its operations. Dana achieves this through active use of its EMS system, development of its E-Reps and proactive engagement with offshore and operational groups. Through these routes Dana ensures work activities incorporate current and developing legislation, and initiatives shared from government and industry work groups.

Through increasing production and reserves, Dana continues to operate in Europe, the Middle East and Africa, and wherever it works minimisation of environmental impact is a key business driver.



Dana Petroleum Vision and Values

We work hard to deliver the best results, using our values to guide how we do business, wherever we operate in the world.



Health, Safety, Security & Environment (HSSE) Policy

Health, Safety, Security & Environment (HSSE) Policy



Our policy

The safety of our people and assets, and respect for the environment are two of our core values and are an integral part of how we do business. We believe strong Health, Safety, Security and Environmental (HSSE) performance creates strong commercial performance.

Accountability

The Chief Executive Officer (CEO) has overall accountability to the Dana Board of Directors for the management of HSSE.

Scope

Our policy applies to all employees (staff, contract and temporary), officers and directors of Dana Petroleum Limited (collectively referred to as 'employees') in each of our operating units worldwide and anywhere that we conduct business or visit in the course of our business. It also extends to all our joint ventures business, in all countries in which we or our subsidiaries and associates operate. Where we have a minority interest we will encourage the application of this policy amongst our business partners including contractors, suppliers and joint venture partners.

Policy in practice

Dana strives to continually improve its HSSE performance by setting and monitoring clear objectives, supported by its HSSE Standards. This requires the commitment of everyone at Dana and a culture where people are encouraged and feel able to intervene and report on HSSE issues of concern. It is expected that each individual will recognise their responsibility to put our policy into practice.

We will:

- Provide a safe working environment that protects against injury and minimises work-related ill health
- Provide appropriate security protection for employees and assets
- Commit to prevent pollution, minimising the impact to the environment from Dana's operations
- Ensure compliance with applicable legislation and apply Dana's standards and oil industry best practice in locations where local laws do not exist
- Identify and manage HSSE risks in a systematic way as part of Dana's risk management framework
- Create clear accountabilities and expectations for HSSE at every level of the organisation
- Provide resources to successfully manage HSSE risk
- Identify and manage any form of change in our organisation
- Ensure that our employees and contractors are competent and able to perform the work we are asking them to undertake
- Ensure that our employees and contractors understand their HSSE accountabilities and are aware of the behaviours expected by Dana
- Identify and manage operational interfaces internally and with third parties
- Communicate standards based on oil industry best practice which are consistent with legal and regulatory requirements in all operating areas
- Communicate and report openly on HSSE objectives and performance
- Actively engage with relevant stakeholders to understand and take account of their concerns
- Make sure that appropriate emergency response, crisis management and business continuity plans are in place and are regularly tested
- Investigate HSSE incidents, identify root causes, take effective action to prevent recurrence and identify opportunities for organisational learning
- Strive for continuous improvement of Dana's HSSE performance

Roy Elliot
 Chief Executive Officer



2017

Overview of Operations

Dana’s portfolio in the UK consists of various exploration, production and development activities throughout the northern, central and southern North Sea.

Dana is the operator of the Greater Guillemot Area (GGA) which is produced through the Triton floating, production, storage and offloading (FPSO) (also operated by Dana), and the Hudson field that is produced through the TAQA operated Tern Platform (Figure 1).

Dana is the operator of the Western Isles Project. This project is developing two oilfields named Harris and Barra in the northern North Sea, 160 km east of Shetland and 12 km west of Tern field (Figure 1). It involves a subsea development of production and water injection wells tied back to a new FPSO with oil export using shuttle tankers. When onstream in late 2017, plateau production is expected to be around 40,000 boepd, adding more than 30,000 boepd net to Dana’s UK production.

Dana is operator of the proposed Arran gas/condensate development in the central North Sea and is a 50% equity partner in the proposed Tolmount gas/condensate development in the southern North Sea.

In addition, Dana has interests in 25 operated and non-operated oil and gas fields and 19 exploration licenses in the UK.

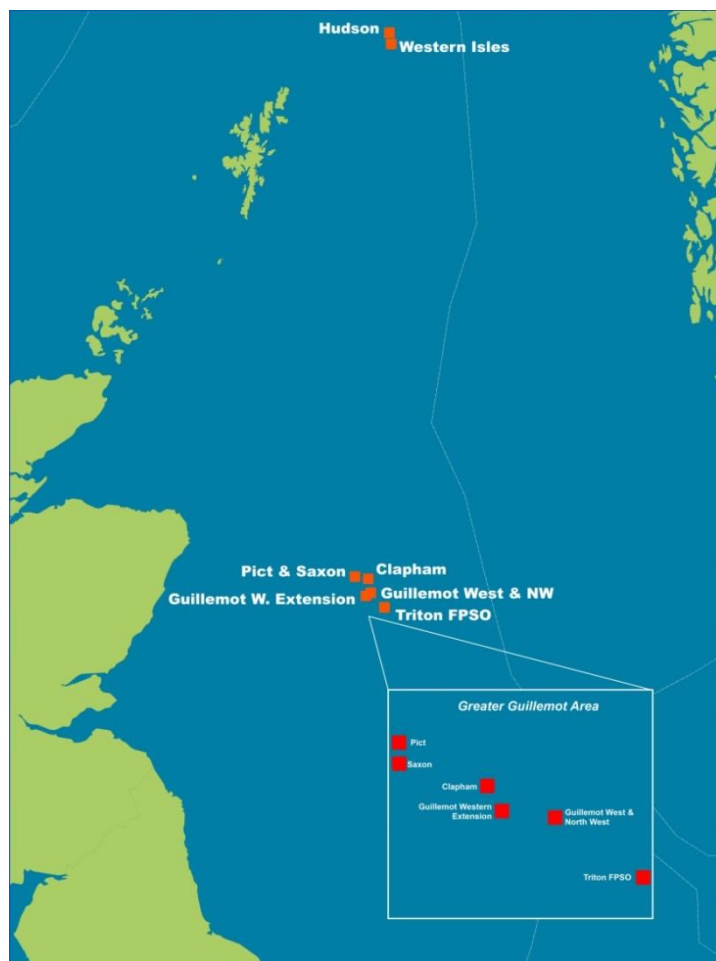


Figure 1: Dana Operated Production Assets

Production Operations

Triton FPSO

Dana has been operator of the Triton FPSO since October 2012 and the Greater Guillemot Field since October 2010 (Figure 2). The Triton FPSO is located in the central North Sea (in Block 21/30) approximately 193 km east of Aberdeen (Figure 3). The Triton FPSO produces oil and gas from the Dana operated Clapham, Pict, Saxon, Guillemot West and North West fields as well as from the Shell operated Bittern Field.

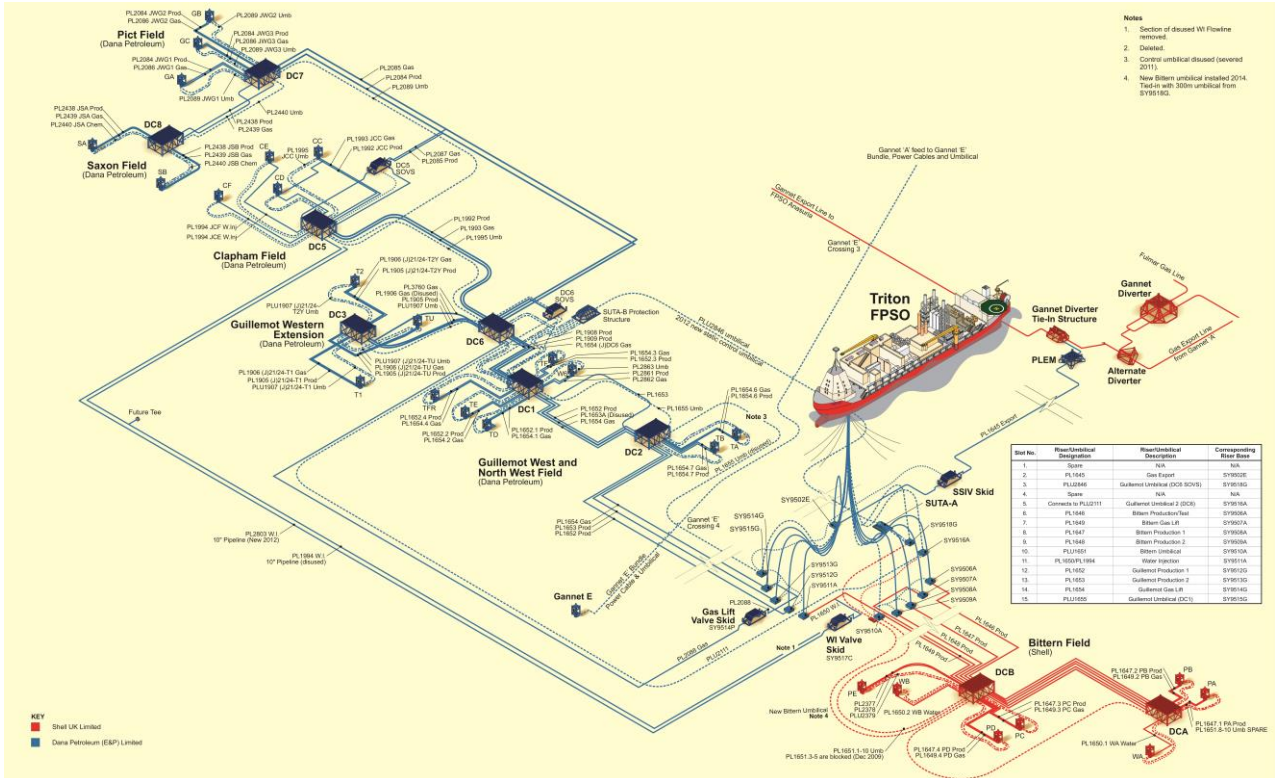


Figure 2: Triton FPSO and GGA diagram



Figure 3: Triton FPSO and GGA Field Map

Field Data	Guillemot West	Guillemot North-West	Clapham	Pict	Saxon	Bittern
Location	Central North Sea Blocks 21/29a, 21/25, 21/30 & 21/29b Approx. 13 km NW of Triton FPSO	Central North Sea Block 21/24 Approx. 14 km NW of Triton FPSO	Central North Sea Block 21/24 Approx. 22 km NW of Triton FPSO	Central North Sea Block 21/23b Approx. 34 km NW of Triton FPSO	Central North Sea Block 21/23b Approx. 35 km NW of Triton FPSO	Central North Sea Blocks 29/1a & 29/1b Approx. 20 km SE of Triton FPSO
First Production	March 2000	March 2000	March 2000	June 2005	November 2007	March 2000
Wells	4 production	1 production	2 production & 2 water injection	3 production	2 production	5 production & 2 water injection

Table 1: Dana Operated Fields

Hudson

The Hudson field is located in Block 210/24a and lies approximately 85 km northeast of the Shetland Islands. The field is produced as a subsea tieback via the TAQA Tern Alpha platform that is located approximately 10 km to its east. The Hudson field comprises 7 production wells and 2 water injection wells.

Drilling Operations

In 2016, drilling operations were undertaken from the *Ocean Guardian* at the Western Isles Development’s North Drill Centre (NDC) and South Drill Centre (SDC).

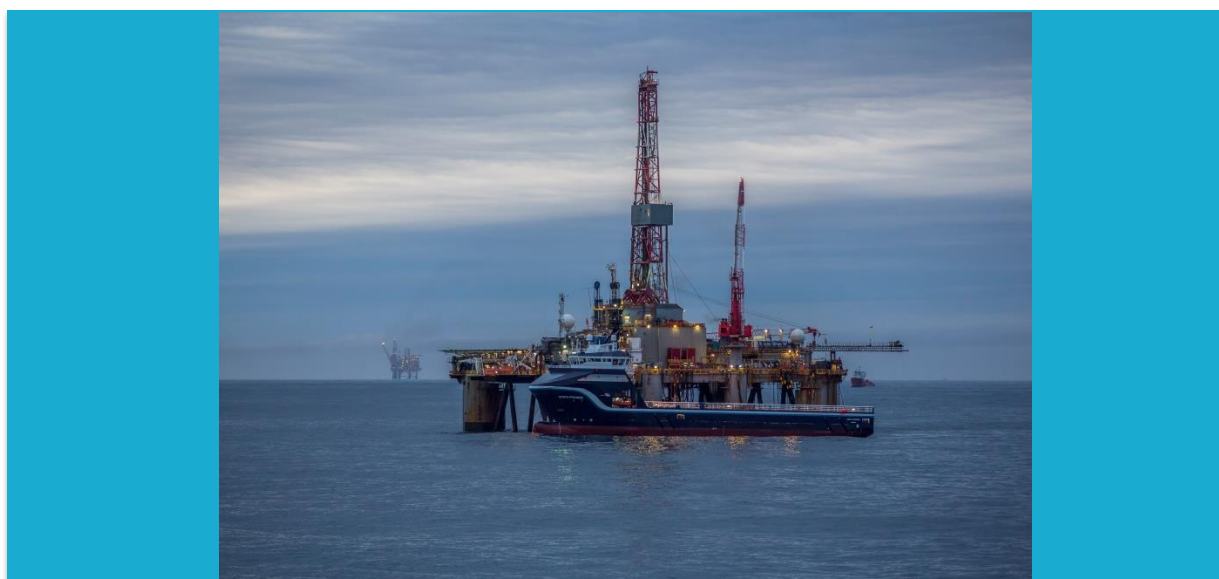


Figure 4: Ocean Guardian Drilling Rig

Decommissioning Operations

Dana did not conduct any decommissioning operations during 2016.

HSSE Management System

Dana is committed to managing any potential environmental impacts associated with its activities. Dana meets this commitment within the UK via the implementation and maintenance of an Environmental Management System (EMS) within its One Dana Management System (ODMS).

The ODMS delivers the arrangements to reduce and manage risk, and to implement the company's HSSE Policy. The management system provides an essential framework and rules to ensure Dana's operations, anywhere in the world, are safe and secure and minimise environmental impact at all times. The Dana HSSE Policy and Standards provide the framework to help deliver safe and reliable operations that are resilient over the long term and enable continual improvement.

The Dana UK EMS is structured to meet the requirements of Dana's HSSE Standards and was developed in line with elements of the Standard ISO 14001: 2004 and OSPAR Recommendation (2003/5). In line with the ODMS, Dana's UK EMS follows the basic structure of "Plan, Do, Check, Act" (Figure 5).



Figure 5: Dana UK EMS

Key Elements of Dana UK's EMS

Environmental Aspects and Impacts Register

The key to Dana managing its impacts is a detailed understanding of the potential environmental risks posed by its activities. By systematically identifying the environmental aspects relevant to its UK operations, Dana has assigned the appropriate levels of control required to minimise environmental impact. Dana's environmental aspects inform the remainder of the EMS.

Environmental Legislation Register

In order to operate wholly within the law, it is necessary to understand all applicable legislation and its implications. This is achieved through development of a Environmental Legislation Register that is regularly reviewed.

Objectives and Targets

Continual improvement in environmental performance is achieved through setting of challenging objectives and targets. These are identified and HSSE Improvement Plans agreed annually at formal review meetings with senior management and operations teams.

Competence, Training and Awareness

Dana is committed to ensuring all personnel understand the value of the EMS to Dana, and how this is used to minimise impacts to the environment from the company's operations. All Dana staff and contractors are provided with relevant training to enable them to conduct their work wholly within the legislation and company environmental commitments.

Environmental Communication

Within Dana, communication of environmental issues is achieved using email, company noticeboards, Dana's Intranet, meetings, environmental bulletins and environmental support packs for specific operations. A programme of environmental awareness is prepared and circulated offshore each quarter that highlights current themes or areas for improvement.

Emergency Preparedness and Response

Dana has procedures to identify potential events and to ensure the required control measures are in place for the prevention of emergencies and for the management of events should they occur. Regular exercises are undertaken to assess the efficacy of these plans, with results captured to identify 'lessons learned'.

Audit

Monitoring of legislative compliance, environmental performance and progress towards achievement of goals and targets is achieved through regular auditing. Dana develops an annual audit schedule that identifies a range of internal and external audits. All actions and their progress until completion are managed using incident tracking software.

Management Review

An annual management review is conducted to review and assess environmental performance over the preceding year. This helps to formulate the objectives and set targets for the next year.

Environmental Performance

Atmospheric Emissions

Fuel combustion and flaring operations are the principle source of atmospheric emissions from the oil and gas industry. Carbon dioxide (CO₂) is the main exhaust gas but combustion also results in emissions of CO, CH₄, NO_x, SO_x and VOC's. The largest proportion of Dana's CO₂ emissions is generated by the combustion of fuel for power generation. Figures 6 and 7 show the emissions generated during Dana production operations from 2013 to 2016. Figures 8 and 9 show the emissions generated during Dana drilling operations for the same period.

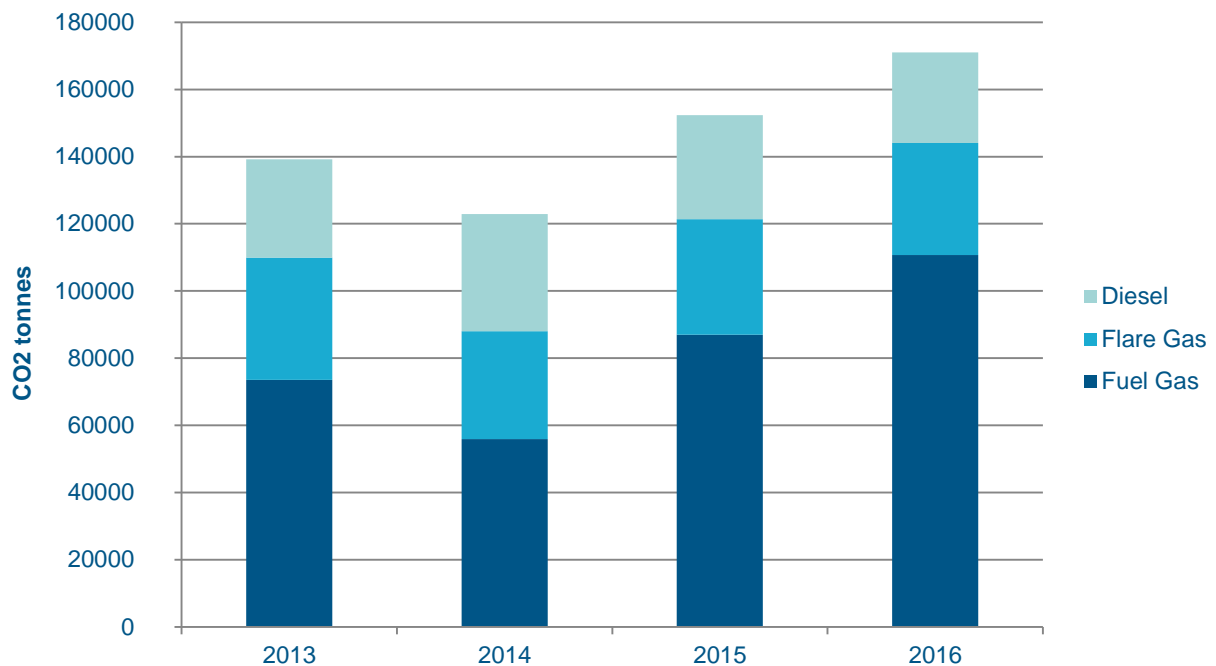


Figure 6: CO₂ emissions from combustion of fuel gas, flare gas and diesel during Dana production operations 2013 – 2016

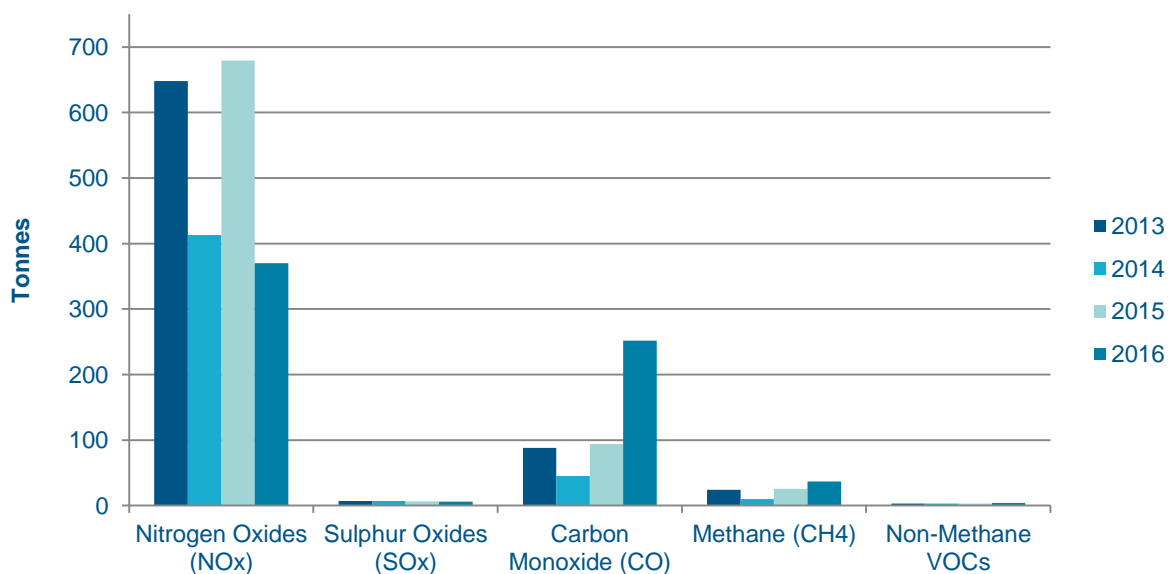


Figure 7: Atmospheric emissions from combustion of fuel gas, flare gas and diesel from Dana production operations 2013 – 2016

Atmospheric Emissions

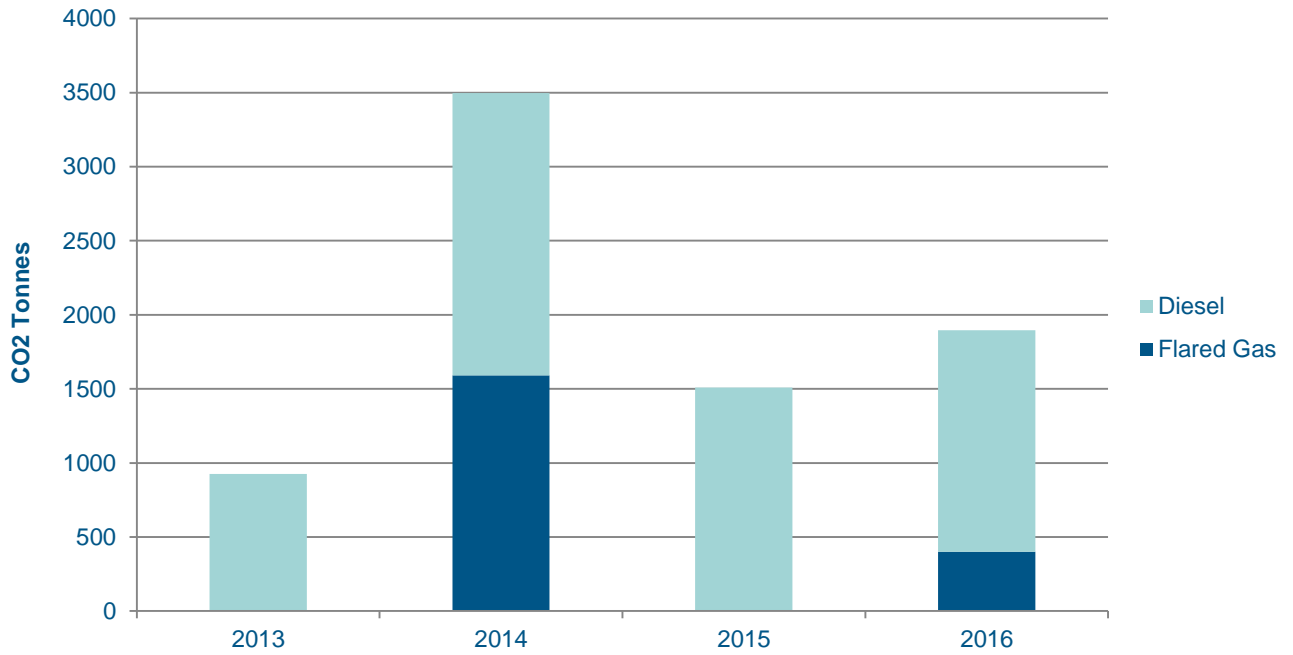


Figure 8: CO₂ emissions from combustion of flared gas and diesel during Dana drilling operations 2013 – 2016

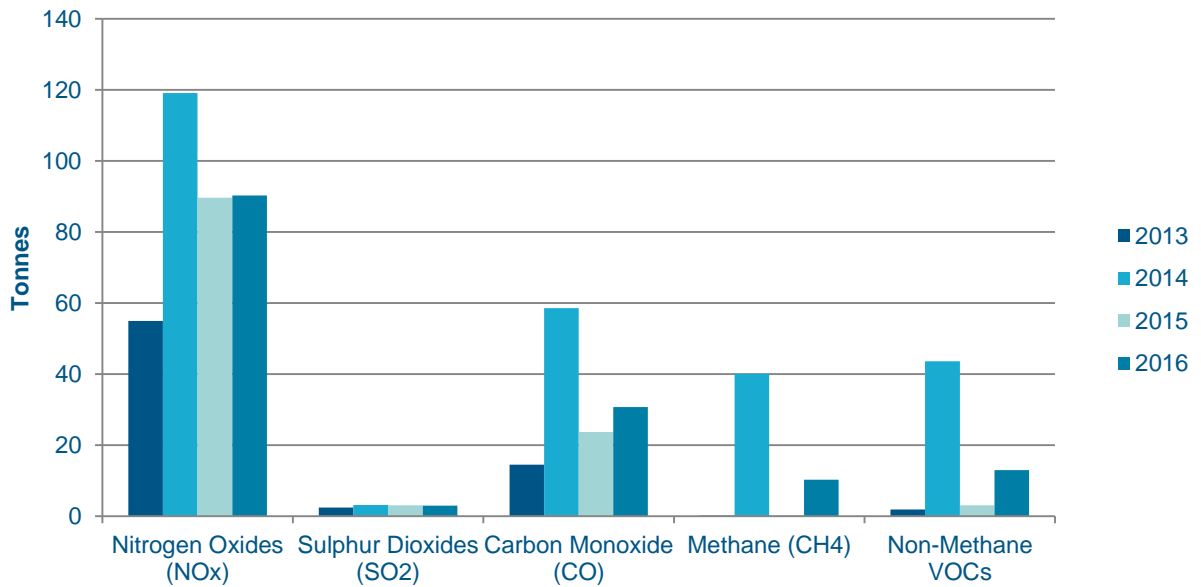


Figure 9: Atmospheric emissions from combustion of flared gas and diesel from Dana drilling operations 2013 – 2016

Oil in Water

Dana’s Oil Discharge Life Permit allows the discharge of produced water from the Triton FPSO, provided the concentration of dispersed oil in produced water does not exceed permitted limits of 30 mg/l (monthly average). Separation of oil and gas from produced water is achieved onboard the Triton FPSO via the use of Hydrocyclones, Degassers and Compact Flotation Units.

During 2016, the total volume of produced water discharged from Triton’s production operations was 4,317,555 m³ (Figure 10). The 2016 annual average oil in water concentration for Triton was 24.38 mg/l, which resulted in a total of 104.4 tonnes of oil being discharged to sea (Figure 11).

Hudson produced water is managed by the Tern Alpha platform. During 2016, the total volume of produced water discharged from Hudson’s production operations was 485,136 m³. The 2016 annual average oil in water concentration for Hudson was 12.62 mg/l, which resulted in a total of 6.37 tonnes of oil being discharged to sea.

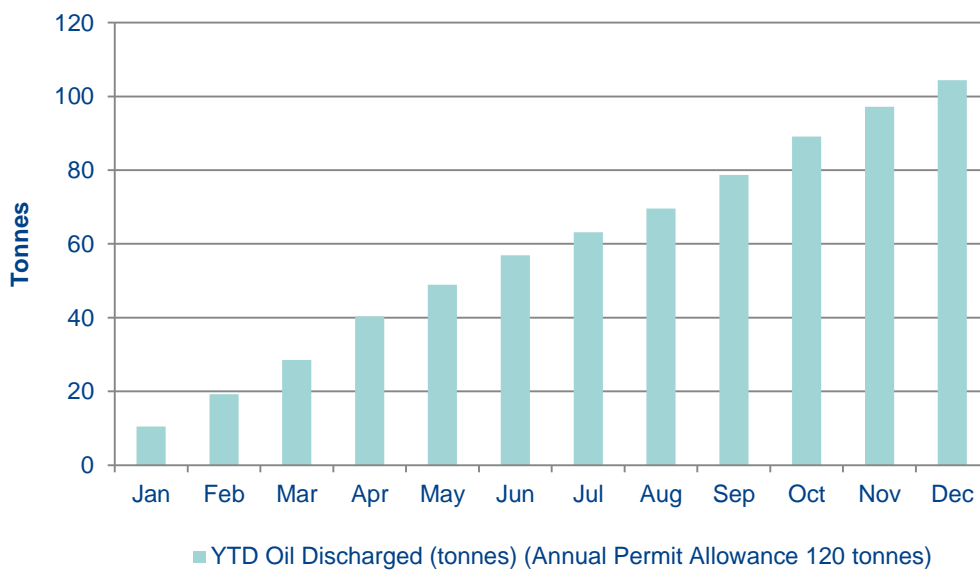


Figure 10: Oil in discharged (tonnes) in Produced Water from Triton in 2016

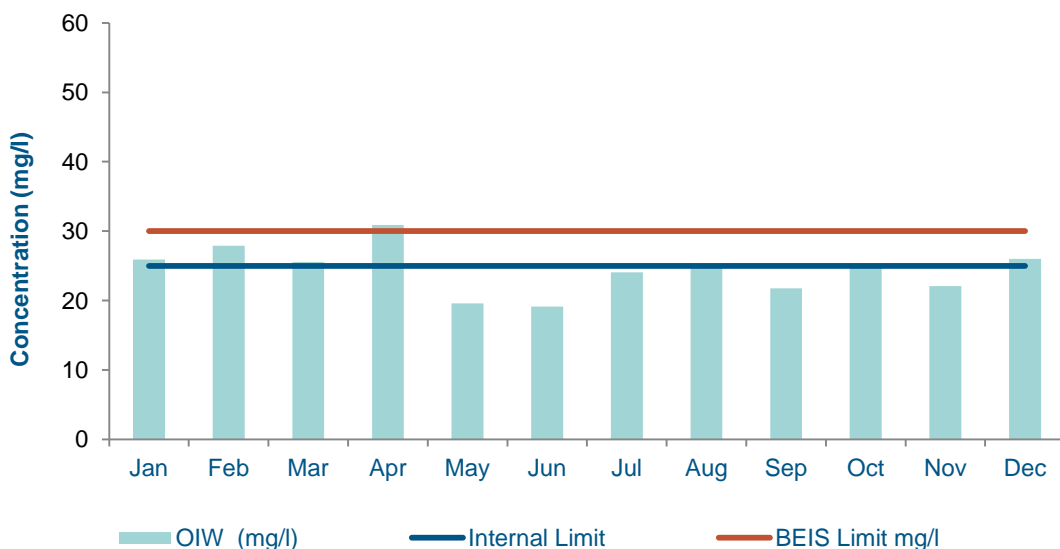


Figure 11: Oil concentration (mg/l) in discharged Produced Water from Triton in 2016

Chemical Use and Discharge

A wide range of chemicals is required during drilling, subsea and production operations, all of which must be risk assessed as part of the permit approval process. The use of chemicals that are deemed to present a greater risk to the environment must be further justified. A number of chemicals have been identified as candidates for substitution, wherever possible these chemicals should be phased out in favour of substitution free alternatives.

In addition to production operations, Dana conducted a number of campaigns including drilling and the maintenance and repair of subsea infrastructure most of which resulted in the use and discharge of chemicals. Approximately 41% of the chemicals that Dana used in 2016 had a lower environmental risk rating (PLONOR and OCNS category E) (Figures 12 and 13). However, approximately 40% of the total chemical discharge for 2016 was as a result of chemicals containing a substitution warning.

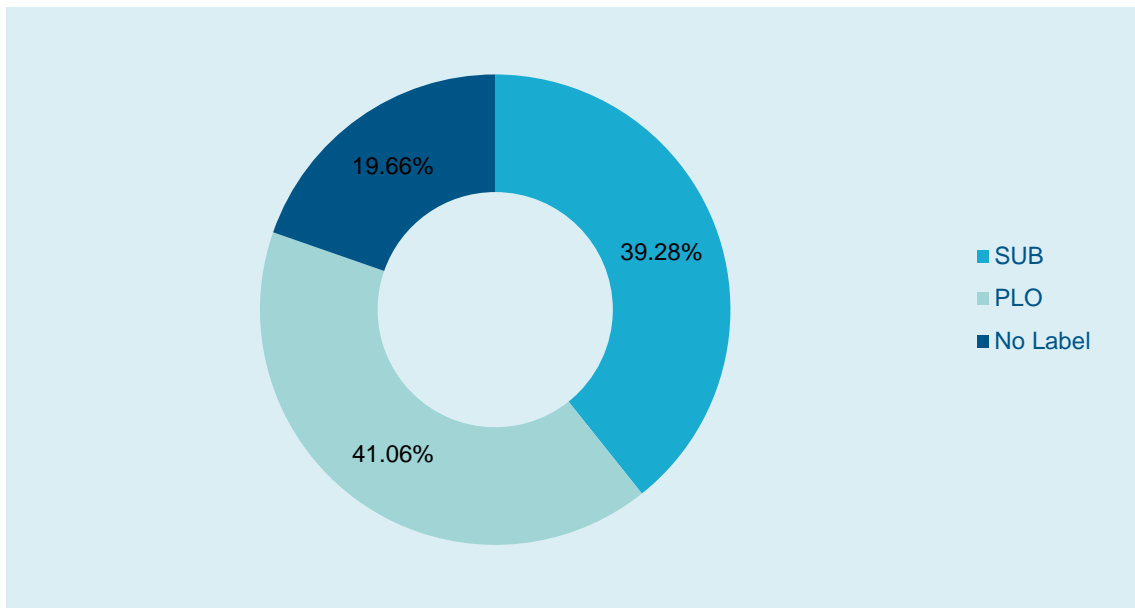


Figure 12: Dana chemical discharges by chemical label in 2016

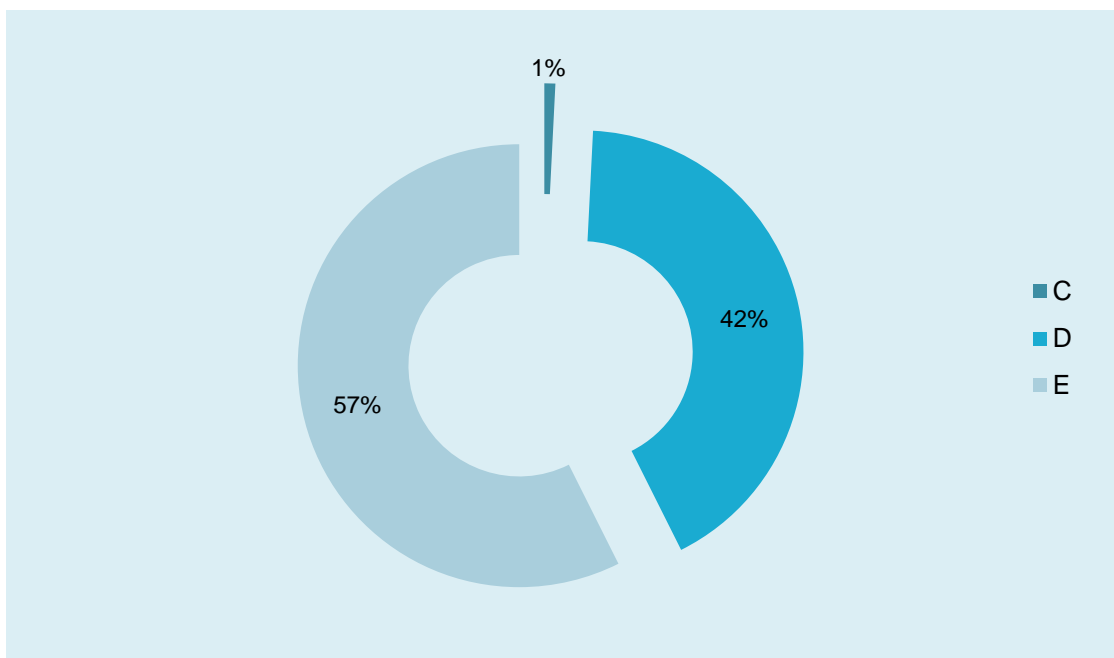


Figure 13: Dana chemical discharges by OCNS Ranking in 2016

Waste

To ensure its minimisation, offshore waste is managed in accordance with the waste hierarchy. Inevitably, however, waste is generated all of which is removed to the shore for appropriate disposal. Waste generated offshore is segregated at source into special, general and recyclable waste.

During 2016, a total of 2,565 tonnes of waste was generated from Dana's offshore production and drilling operations. The majority of production waste was recycled (42%) or sent to landfill (42%) (Figure 14). For drilling operations the majority of waste was drill cuttings that were transferred to an onshore processing unit (50%) (Figure 15).

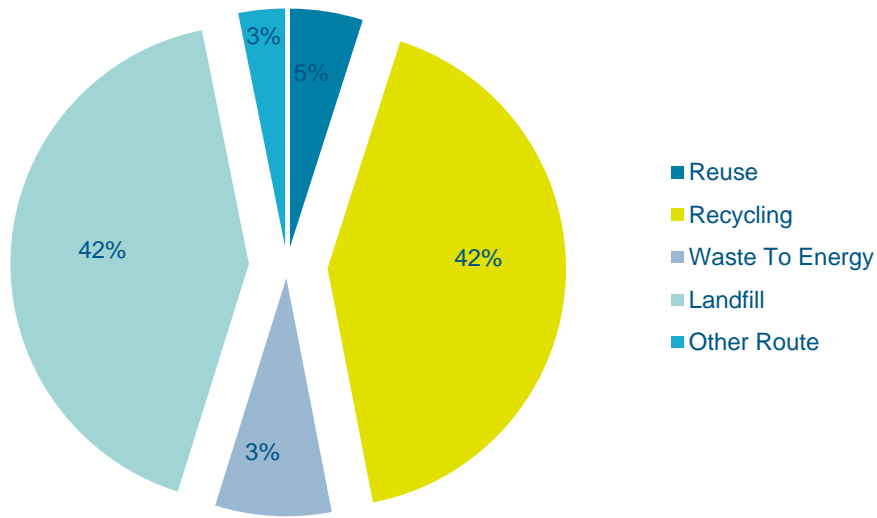


Figure 14: Waste disposed from Triton production operations in 2016

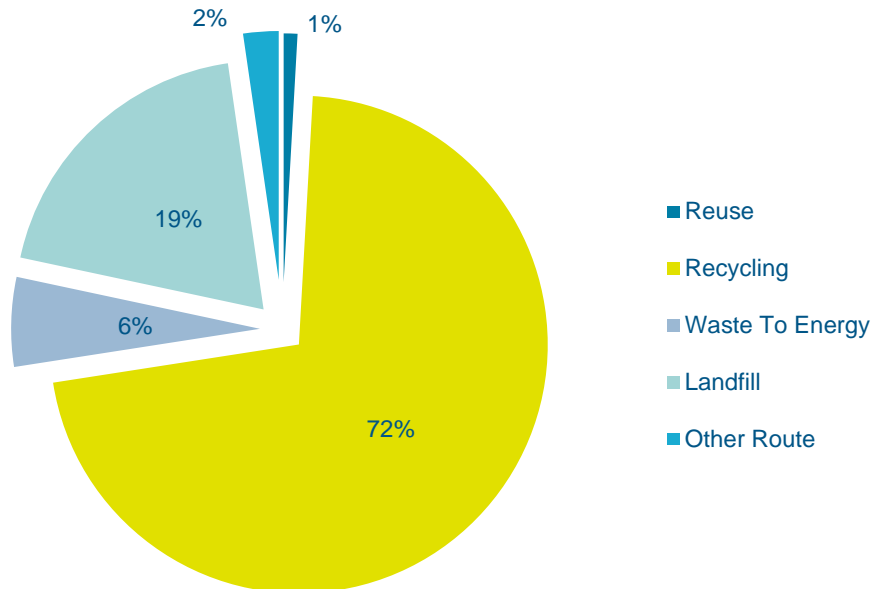


Figure 15: Waste disposed from Dana drilling operations in 2016

Unplanned Releases

Under the Merchant Shipping (Oil Pollution Preparedness, Response and Co-operation Conventions) Regulations 1998, all offshore operations must have in place an approved Oil Pollution Emergency Plan. This sets out the procedures that Dana will follow in the event of a spill.

Dana has a number of mitigation measures in place to help prevent the likelihood of a spill occurring. However despite these, a small number of spills occurred in 2016, all of which were reported to BEIS via a PON1 submission.

Dana reported a total of five unplanned releases of chemicals and four of oil (Table 2).

Operation Type	Chemicals		Oil	
	Number of notifications	Total Quantity (tonnes)	Number of Notifications	Total Quantity (tonnes)
Production	2	0.259	2	2.53
Drilling	3	64.7	2	0.0041

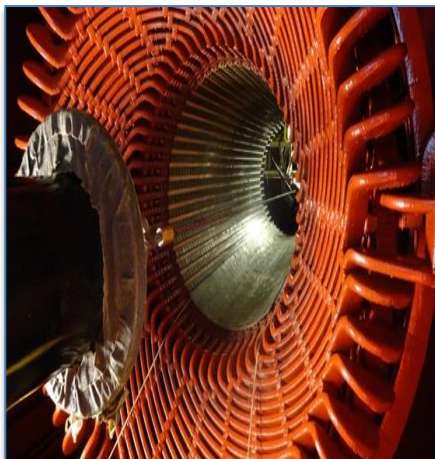
Table 2: Total number and volume of oil and chemical notifications from Dana operations in 2016



Environmental accomplishments

During 2016 Dana completed a number of environmental achievements including:

- EUETS site verification visit completed on Triton FPSO
- Reduction in the total number of chemical unplanned releases from Dana operated assets
- Environmental involvement during major procurement process
- Successful environmental audit campaign
- Produced Water Risk Based Analysis report submitted to BEIS
- OPEP exercise training manual developed and rolled out



2016 Environmental Performance against Objectives

Dana's key performance indicators (KPIs), Metrics and Measures for 2016 were successfully completed (Table 3).

2016 Objective	Performance
Enhance oil in water management and competency for Triton FPSO	<p>Annual average oil in water concentration of 24.38 mg/l against internal target of 25 mg/l (and regulatory limit of 30 mg/l).</p> <p>Oil in water awareness and management guidance rolled out to operations team.</p> <p>Routine compliance meetings with operations team completed to ensure Oil Discharge permit is in line with the produced water improvement plans</p>
Improve F-Gas management process to ensure continued regulatory compliance	<p>Routine interface with F-Gas vendor and Triton FPSO operations team.</p> <p>Continued improvement in co-ordination of F-Gas equipment maintenance with specialist vendor.</p> <p>Use of Maximo to control F-Gas maintenance regime</p>
Continued consolidation of E-Rep network including internal network session	<p>Structured environmental awareness material issued to E-Reps throughout the year.</p> <p>Environmental housekeeping toolkit developed and issued to E-Reps to use during site walk rounds.</p>
Update OPEP plans in line with BEIS guidance and obtain approval from the regulator	OPEP documentation updated and approved.
Develop and roll out oil spill training manual to support new OPEP documents	Oil spill training manual developed and rolled out to Triton FPSO.

Table 3: Objectives and performance for 2016

Environmental Objectives for 2017

Dana has developed the following environmental objectives for 2017

Successful independent re-certification of Environmental Management System

Successful completion of SOSREP Exercise

Develop solutions to the produced water non-compliances experienced during 2016

Update outstanding Western Isles FPSO, Hudson and Onshore OPEP documents to align with new requirements

Develop compliant environmental system for new Western Isles FPSO

