1. Introduction
This document presents Hurricane Exploration plc’s (Hurricane) annual public statement for 2011, in line with the objectives of OSPAR Recommendation 2003/5 to Promote the Use and Implementation of Environmental Management Systems by the Offshore Industry, as implemented by the Department of Energy and Climate Change (DECC) in the UK. The OSPAR Recommendation requires all operators of seaward licences to have an accredited Environmental Management System (EMS), and also requires each offshore operator to produce an annual public statement covering all offshore operations undertaken in the previous calendar year.

2. Hurricane Exploration plc
Hurricane is an oil and gas exploration company headquartered in the UK. The company comprises a small technical team, which is focused on exploring for and developing oil reserves from fractured basement reservoirs. Hurricane is the operator of three UK offshore licences (P.1835, P.1485 and P.1368) situated in Quadrants 204 and 205 to the west of Shetland. To date, Hurricane has drilled three exploration wells, including re-entry and well testing operations at two of these locations, under these licences. Hurricane relinquished its onshore Petroleum Exploration and Development Licences (PEDL) in 2011. All offshore operations are co-ordinated from the Hurricane offices in Godalming, Surrey and in Aberdeen.

3. Environmental Management System
Hurricane is fully aware of the potential environmental implications of its business operations and takes its responsibilities towards safeguarding the environment very seriously. This ethos of responsibility is incorporated at a fundamental level within the Hurricane environmental policy and EMS which commit us to continually strive for improved environmental performance. All employees, contractors and suppliers are encouraged to identify and reduce the environmental impacts of any activities undertaken by or on behalf of Hurricane.

Hurricane considers compliance with all relevant environmental laws and regulations as the minimum standard for our operations and is enthusiastic about pursuing all practicable measures available to achieve levels of environmental performance beyond this standard.

Hurricane operates an ISO 14001 EMS in line with the requirements of OSPAR Recommendation 2003/5. The EMS is subject to regular external verification, and was last externally re-certified by NQA on 30 August 2011. The EMS describes the management controls in place to ensure that all operations are conducted in a responsible manner with respect to environmental issues and covers all offshore operations undertaken by, or on behalf of, Hurricane.

The EMS is regularly reviewed to ensure that it remains consistent with the scope of Hurricane operations. The current scope of the EMS is summarised below, including recent and upcoming changes where appropriate:

- Offshore drilling, including well testing
- Offshore seismic, geophysical and environmental surveys
- Development of offshore assets; this aspect of operations is not currently covered by the EMS as the development of Hurricane’s fields is currently at the planning stage
- Onshore drilling and surveys; these activities were removed from the scope of the EMS in 2011 as Hurricane has relinquished the related onshore licences
- Office activities (England and Scotland); office based activities are also managed under the EMS but, as these are not covered under the scope of DECC guidance and reporting requirements, they are not discussed further in this report

3.1. Environmental policy
Following the principles of ISO 14001, the Hurricane environmental policy (Figure 3.1) outlines the commitment not only to comply with statutory regulations and codes of practice, but also to prevent pollution and strive for continual improvement in environmental performance. The environmental policy sets out the framework for the rest of the EMS.
Hurricane Exploration plc

Environmental Policy

Hurricane Exploration plc recognises its responsibility to the environment, and will take positive steps to address the environmental impact of its business operations.

We are committed to achieving continuous improvement on our environmental performance, and regard compliance with the relevant laws and regulations as a minimum standard.

We will work with our customers, employees, contractors and suppliers to identify and reduce the environmental impacts of our activities.

Our Objectives:

• All our office based and offshore operations shall be managed under our BS EN ISO 14001:2004 Standard Certified Environmental Management System

• We will involve our employees in maintaining the Environmental Management System, provide a clear feedback structure and establish appropriate operating practices and training programmes

• All our employees will be selected, trained and developed to carry out their duties safely, competently and with due care for the environment

• We will implement measures to prevent pollution to the environment, where reasonably practicable

• We will continuously review all our business operations, in order to identify and, where practicable, minimise our environmental impacts

• We will set appropriate environmental targets, monitor progress in achieving them and report the results to the Board on a regular basis

• We will take environmental considerations into account in all our operations, ensure that our suppliers and contractors are aware of our policy, and encourage them to commit to good environmental practices

These objectives will be regularly reviewed and specifically prior to any major operational activity. Their achievement will be measured and reported to the Board of Directors. They form the basis from which internal targets for achievement are set and those in turn will be monitored, reported and revised.

Dr Robert Trice
CEO
20 March 2012
3.2 The environmental aspects and impacts registers

The environmental aspects and impacts register identifies all activities undertaken by Hurricane which may interact with the environment. Each potential environmental impact is assessed for its significance, to ensure that suitable and sufficient management controls are in place where required, in order to avoid or minimise any adverse impacts. In order to ensure it is consistent with the current scope of Hurricane’s operations, the environmental aspects and impacts register is reviewed and updated on an annual basis and as part of planning prior to the commencement of every new operation.

In accordance with this approach, before the original drilling operations at Whirlwind commenced in August 2010, the Hurricane environmental aspects and impacts register for drilling operations was reviewed and updated as part of the environmental assessment process conducted for the well to ensure it was appropriate to the scope of operations. This environmental assessment process was initiated with an environmental issues identification (ENVID) workshop, undertaken by key members of the project team and independent environmental specialists. During the ENVID workshop and throughout the planning process, environmental commitments specific to this well were developed.

As the proposed well test aspect of the Whirlwind work programme could not be completed due to poor weather conditions and operational delays (see Section 4), the well was suspended and new operations planned to re-enter and test the well in 2011. The register was again reviewed as part of this new planning process and an additional ENVID workshop held to help update the proposed environmental goals for the new operations and reflecting any relevant operational changes. Additional measures, particularly relating to oil spill prevention, were developed to supplement those initially developed during planning for the 2010 operations. This included a suite of measures identified to prevent a range of small operational spills, such as leaks from well test equipment or spillage of helifuel. Further measures to respond to a potential well blowout, such as access to capping device and a support from well control specialist contractor, were also developed.

3.3. Environmental objectives, goals and targets

As referred to in Section 3.2 above, a number of environmental goals and targets were set for Hurricane’s offshore operations, with specific reference to the particular activities associated with the re-entry and testing of the Whirlwind well. These objectives, goals and targets can be summarised as follows:

- Ensure full legislative and regulatory compliance
- Ensure all licence conditions are met
- Ensure compliance with the Hurricane EMS
- Ensure that all main contractors operate in line with the Hurricane EMS
- No hydrocarbon or chemical spills
- No environmental incidents
- Address any issues raised in the course of the environmental assessment process

Project specific environmental control measures, designed to offset potential impacts of the 2011 offshore operations, were identified through environmental workshops and ongoing communication between environmental advisors and project personnel during the planning process for the Whirlwind well. These measures were included in the environmental assessment for the operations and submitted to DECC for their review and approval as part of the consenting process. These measures were then incorporated into the well programmes, rig work instructions and other operational procedures in order to ensure that all environmental commitments were followed through during the actual operations.

An Environmental Management Plan was then developed, outlining all mitigation procedures and measures in place for the operations. This was used as a checking tool throughout operations by Hurricane’s trained environmental representatives on the rig to monitor that all relevant procedures were being followed and therefore control measures implemented.
4. Offshore well activities and environmental performance 2011

During 2011, Hurricane’s offshore activities consisted of re-entry and well testing operations at Well 205/21a5 (Whirlwind). The Whirlwind well is located in Block 205/21a on the west of Shetland continental shelf, approximately 95 km to the west of the Shetland Islands (Figure 4.1). The primary objective for this well was to drill through and test the two major geological faults identified in which hydrocarbons were expected to be present. The well was originally drilled in August 2010 from the Borgsten Dolphin drilling rig. Hydrocarbons were encountered and an extended well test (EWT) was proposed to establish the potential commercial viability of the reservoir. However, due to operational delays and subsequent onset of bad weather, the planned EWT had to be postponed.

Therefore, in order to properly evaluate the reservoir Hurricane re-entered and tested the well, with operations commencing on 3 September 2011 and ending on 11 November 2011. The operations were conducted from the Awilco WilPhoenix semi-submersible drilling rig. The onset of operations was delayed by the late arrival of the drilling rig and due to time required to conduct a pre-operational regulatory inspection necessary due to the sensitive location and the rig being used for the first time in UK waters.

In order to test the well, the cement suspension plugs were first drilled out with the resultant cement cuttings and associated brine residues discharged at sea, as is common practice on the UKCS. The well test was then conducted but, due to the delays encountered, the well test programme was simplified so its duration and the quantity of hydrocarbons burned no longer qualified as an EWT. After the well test, the well was suspended according to the Oil and Gas UK guidelines, with the wellhead and an additional protective structure left in place.

The following sections summarise the environmental performance for the Whirlwind operations in 2011, using information submitted to the Environmental Emissions Monitoring System (EEMS) and other data sources.
4.1. Accidental discharges

4.1.1. Oil or chemical spills

The Offshore Petroleum Activities (Oil Pollution Prevention and Control) Regulations 2005 (OPPC Regulations) stipulate that any oil or chemical spill within 500 m of a drilling rig or fixed platform must be reported. In the event of such a spill, a PON1 form must be submitted to DECC and other relevant authorities informing them of the incident.

Hurricane encountered some small spill incidents related to the well test during offshore operations in 2010. Due to the potentially serious environmental impacts that could occur as a result of an oil spill to sea, Hurricane highlighted this concern as the main focus of the environmental management system for the 2011 operations, with the ultimate objective of eliminating all spills from their offshore operations. Previous spill incidents were considered as part of a complete review of well test procedures, equipment and contractors in readiness for the Whirlwind well test operations. Hurricane communicated regularly with all offshore personnel to stress the importance of reporting spills to sea of any size in order to meet legal requirements and to help ensure they could be learned from and new practices developed to help prevent future incidents.

Hurricane identified a series of preventative measures to reduce the risk of any oil or chemical spills, which were submitted to DECC for their review and approval in the environmental assessment for the Whirlwind operations. As described above, these measures were carefully worked into the operational procedures, particularly for the well test. These were also subsequently summarised in the environmental management plan to help provide a final check of their implementation. An independent representative for Hurricane was also present on the rig to supervise the commissioning of the well test equipment and guide the completion of the well test itself. However, eight small oil or chemical spill incidents were recorded during the Whirlwind well re-entry and well operations, although these were not directly related to the performance of the well test itself. These are summarised in Table 4.1.

Table 4.1 Summary of oil release incidents during Hurricane’s 2011 offshore operations

<table>
<thead>
<tr>
<th>Date of spill</th>
<th>Quantity spilled</th>
<th>Source of spill</th>
<th>Cause of spill</th>
<th>Response</th>
</tr>
</thead>
<tbody>
<tr>
<td>4 September 2011</td>
<td>0.5 kg</td>
<td>ROV</td>
<td>Hydraulic oil released from submerged ROV due to a detached pipe fitting.</td>
<td>ROV was recovered, the detached fitting re-secured and all other fittings checked.</td>
</tr>
<tr>
<td>13 September 2011</td>
<td>1.0 kg</td>
<td>BOP control pod</td>
<td>Excessive release of BOP control fluids during daily test of BOP functions.</td>
<td>Control pod was recovered for repair.</td>
</tr>
<tr>
<td>15 September 2011</td>
<td>0.5 kg</td>
<td>BOP control pod</td>
<td>BOP control fluid released due to a leaking unlatch component.</td>
<td>Function placed into block mode to prevent further release.</td>
</tr>
<tr>
<td>18 September 2011</td>
<td>4.0 kg</td>
<td>BOP control pod</td>
<td>Currents caused podline flexing leading to leak of BOP control fluid from failsafe mini connector latch.</td>
<td>Manifold pressure was lowered to stop the leak and control pod was recovered for repair.</td>
</tr>
<tr>
<td>29 September 2011</td>
<td>0.05 kg</td>
<td>ROV</td>
<td>Residual hydraulic fluid from the ROV bunded area had contaminated the ROV skid.</td>
<td>Bunded area was cleaned and ensured ROV skids were clean prior to future launches.</td>
</tr>
<tr>
<td>4 October 2011</td>
<td>2.0 kg</td>
<td>BOP control pod</td>
<td>Pressure control line in an umbilical was damaged during a storm causing the release of control fluid.</td>
<td>Pressure was regulated to zero and the hose capped. Hose was then repaired and pressure tested.</td>
</tr>
<tr>
<td>16 October 2011</td>
<td>0.5 kg</td>
<td>BOP control pod</td>
<td>Excessive control fluid was discharged during testing of the BOP lower annular control function.</td>
<td>Function placed into block mode to prevent further release.</td>
</tr>
<tr>
<td>31 October 2011</td>
<td>1.0 kg</td>
<td>ROV</td>
<td>An ROV thruster dislodged from its mounting, breaking a connection and releasing hydraulic oil.</td>
<td>ROV was recovered and the broken connection blanked off. ROV was cleaned of residual oil.</td>
</tr>
</tbody>
</table>
PON1 forms were submitted to DECC and the other relevant authorities in each case. In all cases the spill was small enough to be dealt with by the rig itself and any sheens caused by oil releases dispersed over a short period of time. The majority of releases were of BOP control fluids. These were either unplanned releases of excess fluids during the testing of the BOP control system, which was ultimately required to ensure its proper function or accidental releases due to unexpected damage to the BOP. The remaining releases were related to the operation and maintenance of the remote operated vehicle (ROV) by a third party contractor on the rig. The incidents involved were reviewed and the reasons for the cause of the spills discussed with the ROV contractors so that the lessons learned could be used to help prevent similar incidents occurring in the future.

Hurricane strongly emphasises prevention over response with regard to oil spills during both planning and execution of offshore operations. Therefore, a variety of preventative measures were identified for these operations to help minimise the risk of both small and large spills. Basic training in the impacts of oil spills and the project specific control measures to be followed to prevent spills was also provided to all rig personnel involved in the Whirlwind operations. However, in order to respond swiftly and effectively in the unlikely event of a large oil spill during the 2011 operations, Hurricane also developed a range of response measures, such as completing a relief well plan and arranging access to a capping device.

In concert with this approach relevant Hurricane personnel had undertaken comprehensive oil spill response training, in accordance with DECC training guidelines in previous years. In addition, all Hurricane employees receive oil spill response awareness training as a minimum.

4.1.2. Dropped objects

On 19 October 2011, a ten metre length of well test pipe was being recovered when the motion of the rig caused it to be caught on the rig structure, the crane sling parted and the pipe was dropped into the water. This was reported to DECC on the statutory PON2 reporting form within six hours of the event. The ROV was launched to locate the length of pipe and its location noted. However, when later attempts were made to re-locate and recover the length of pipe, it was not found at the previously recorded location. After a persistent search it was concluded that the pipe had been obscured by sediment build up and attempts to retrieve it were ceased.

4.2. Planned emissions and discharges

4.2.1. Oil discharges

The OPPC Regulations prohibit the discharge of oil into the sea, other than in accordance with the terms of a permit issued to cover such discharges. Hurricane obtained consent for a number of different oil bearing discharges during the 2011 Whirlwind well re-entry and testing operations as discussed below.

In terms of the sequence of operations, an OPPC permit was first potentially required for the discharge of cuttings generated by drilling out of the suspension plugs (cement pug and an adjacent mechanical bridge plug) to gain access to the formation, followed by a small extension to the well to accommodate the well test equipment. If the well had become filled with oil from the reservoir (‘recharged’) during the suspension period and if the mechanical bridge plug had failed over time, it was possible that it and a small extent of the adjacent cement suspension plug could become contaminated with reservoir oil during the drilling process. Similarly, drilling to extend the wellbore could also have resulted in the generation of oil bearing drill cuttings. Therefore an OPPC permit was obtained as a contingency to cover the discharge of any affected cuttings if required. During the operations it was seen that the well had not filled with oil and that the bridge plug had remained intact. Time constraints also led to the proposed additional drilling being cancelled. As no contamination had occurred, no reservoir oil was discharged to sea in association with the drilled out plug cuttings. This was reported to DECC via EEMS.

Hurricane also obtained an OPPC permit for the discharge of oil contaminated fluids from the well during clean up of the wellbore required to allow later stages of the operations to proceed. These fluids were expected to consist of a combination of previously used drilling and completion fluids along with crude oil and water from the formation as well as drilling fluids (brine) previously lost to the highly fractured reservoir. Fluids were contained and separated via the well test package onboard the drilling rig, and the water phase was treated to reduce the oil concentration to below the statutory limit of 30 mg/l before being released to sea. As no oil was
encountered in the well, the total discharge of oil associated with the clean up fluids was very low, approximately 0.02 kg.

Finally an OPPC permit was required for any produced water returned to the rig during clean up of the well and subsequent well test. The produced reservoir fluids (oil/water/gas) were also separated onboard the drilling rig, and the water phase was treated to reduce the oil concentration to below the statutory limit of 30 mg/l before being released to sea. The combined total discharge of oil from the produced water was approximately 1 kg. The low volume of oil associated with the produced water was due to the high ratio of gas to oil in the hydrocarbons produced from the reservoir. Oil discharges during the 2011 offshore operations are summarised in Table 4.2.

<table>
<thead>
<tr>
<th>Well</th>
<th>Source of oil</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Oil on cuttings (kg)</td>
</tr>
<tr>
<td>205/21a-5 (Whirlwind)</td>
<td>0.00</td>
</tr>
</tbody>
</table>

### 4.2.2. Cuttings discharge to sea

Proposed additional drilling was cancelled during the operations due to time constraints, therefore no new drill cuttings were generated. The suspension plugs in the Whirlwind well were drilled out using a WBM system and all cuttings were returned to the rig and discharged at the sea surface. In total, 23.8 tonnes of cuttings from the suspension plugs were discharged during the Whirlwind well testing operations.

**SERPENT**

As part of Hurricane’s commitment to exceed minimum standards for environmental performance, and to build on data gathered previously at the Whirlwind and Lancaster well locations, Hurricane undertook new photographic and video ROV surveys during the well testing operations to determine the extent of environmental disturbance on the seabed. These surveys were carried out through the Scientific and Environmental ROV Partnership Using Existing Industrial Technology (SERPENT) based at the UK National Oceanography Centre (NOC) in Southampton.

SERPENT made two visits to the Awilco WilPhoenix drilling rig during 2011, at the beginning and end of the Whirlwind operations. Utilising the drilling rig’s remotely operated vehicles (ROV) during downtime, SERPENT gathered detailed observations and seabed imagery. Hurricane has now collaborated with SERPENT over six visits at its west of Shetland operations, with the 2011 SERPENT study conducted approximately one year after the original Whirlwind drilling operations. By employing SERPENT over consecutive operations at the Whirlwind location, Hurricane has been able to monitor the recovery of local seabed communities over time.

Evidence of recovery at the Whirlwind location was observed in terms of both a reduction in the total area of seabed affected by drilling discharges and an increase in the biodiversity of seabed communities present. The collated results of the ROV studies at the Whirlwind location were also presented to DECC in December 2011. Images gathered during the 2011 survey are shown in Figure 4.2.
The monitoring data acquired through the SERPENT collaboration will help to facilitate a clearer, industry wide understanding of the effects of drilling on seabed communities, and help guide the development of effective mitigation measures.

### 4.2.3. Chemical use and discharge

Chemical use and discharge during offshore operations is controlled by the Offshore Chemicals Regulations 2002 (OCR regulations). These regulations introduced the OSPAR Harmonised Mandatory Control Scheme for the use of chemicals offshore. Within this scheme, all chemicals are ranked according to a hazard quotient (HQ) calculated using the Chemical Hazard and Risk Management model (CHARM). The HQ ranking is divided into six colour bands from least to most hazardous (gold, silver, white, blue, orange and purple).

There are some chemicals to which the CHARM model cannot be applied, e.g., inorganic substances. In such cases, chemicals are assigned a grouping under the Offshore Chemical Notification Scheme (OCNS) based on their toxicity characteristics (A to E). Chemicals which are environmentally benign in seawater are termed as ‘Poses Little or NO Risk’ (PLONOR). All PLONOR products are given an ‘E’ rating (least hazardous).

A summary of chemicals regulated under the OCR Regulations used and discharged during operations at the Whirlwind well in 2011 is presented in Table 4.3. Chemicals are categorised according to either their HQ colour band or OCNS ranking. The majority of the Table 4.3 chemicals used and discharged were classified as PLONOR and/or were ranked in the least environmentally hazardous categories. Since the well re-entry operations did not involve drilling, lower quantities of chemicals were required overall than the previous year’s operations.

#### Table 4.3 Chemical use and discharge quantities from Hurricane’s 2011 operations

<table>
<thead>
<tr>
<th>Category</th>
<th>Number of chemicals</th>
<th>Used (kg)</th>
<th>Discharged (kg)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Silver</td>
<td>1</td>
<td>168.00</td>
<td>112.00</td>
</tr>
<tr>
<td>Gold</td>
<td>11</td>
<td>7,789.00</td>
<td>7,147.00</td>
</tr>
<tr>
<td>OCNS D</td>
<td>1</td>
<td>790.00</td>
<td>790.00</td>
</tr>
<tr>
<td>OCNS E</td>
<td>12</td>
<td>1,240,534.00</td>
<td>707,033.69</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>25</strong></td>
<td><strong>1,249,281.00</strong></td>
<td><strong>715,082.69</strong></td>
</tr>
</tbody>
</table>

Certain chemical components are marked with a ‘substitution warning’ as they are listed on the OSPAR list of chemicals for priority action or due to characteristics such as high toxicity or poor biodegradation potential. The UK National Plan has set interim targets for these chemicals to be replaced with more environmentally friendly products, with priority given to those with the highest toxicity. Hurricane actively sought to reduce the number of chemicals with substitution warnings used during planning of the 2011 Whirlwind well testing operations wherever technically possible. In total, 25 chemical products were used during the operations at Whirlwind, of...
which only one had a substitution warning (CI-28, a corrosion inhibitor). This compared to ten substitution chemicals used during offshore operations in 2010. FORM-A-BLOK, a fluid loss control chemical with a substitutions warning, was also included as a contingency chemical for the operations in case downhole conditions required it, but was ultimately not used.

For the short-term, it is anticipated that the only future offshore activities that may be undertaken by Hurricane will be further exploration and appraisal drilling in varying locations. As a different suite of chemicals may be required from one well to the next, it is very difficult to manage the ongoing use of specific chemicals or schedule the replacement of less favourable chemicals. However, Hurricane will encourage drilling contractors to look for suitable alternatives for future drilling operations.

A non-conformance in relation to the permitted chemical use and discharge under the OCR regulations occurred during the 2011 offshore operations. The non-conformance arose during the setting of suspension plugs at Whirlwind, wherein two cementing chemicals were discharged in quantities in excess of the permitted limits. The chemicals involved were AccuSet D197 and Environmentally Friendly Dispersant B165. The non-conformance primarily arose due to issues associated with the preparation of the PON15B application, proper verification of the permitted use and discharge prior to operations, and monitoring of use and discharge during operations. These factors resulted in offshore personnel unknowingly breaching the permitted quantities for discharge of these chemicals.

Hurricane identified a series of measures designed to augment the existing review and offshore monitoring of chemical use and discharge in order to prevent re-occurrence of such issues during the remainder of the Whirlwind operations and any future offshore operations. These included additional levels of verification of proposed chemical use prior to operations, training in guidance on cement discharge and unification of data sources for chemical tracking. Better communication between the various parties involved was also encouraged to avoid omissions which could incur future non-conformances.

4.2.4. Waste management and disposal

As an oil and gas operator, Hurricane records the amount and disposal route of any waste generated and disposed of in the UK. Under the relevant environmental legislation, waste generated during exploration activities must be segregated and stored appropriately for disposal onshore. Waste is typically segregated and recorded according to the following categories:

- Group I is special waste such as oils, paints, surplus chemicals etc
- Group II is general waste including domestic waste. Segregated materials, such as scrap metal, plastics, wood, paper and cardboard, are recycled
- Group III is hazardous waste including asbestos, clinical and explosive materials
- Group IV is waste from drilling (eg contained low toxicity oil base mud (LTOBM) contaminated cuttings). Referred to as ‘backloaded’ cuttings
- Group V waste is Naturally Occurring Radioactive Material (NORM) from mineral scales which build up in processing equipment and pipe work (generally from production installations only)

A total of approximately 155 tonnes of waste was generated during Hurricane’s offshore operations in 2011. The types, quantities and disposal methods for waste generated during these operations are shown in Table 4.4. As only water base drilling muds were used during operations, all drill cuttings generated were discharged to sea. Therefore, no cuttings were returned to shore as Group IV waste.
Table 4.4 Waste generated during all Hurricane offshore operations in 2011

<table>
<thead>
<tr>
<th>Waste category</th>
<th>Reuse (kg)</th>
<th>Recycling (kg)</th>
<th>Waste to energy (kg)</th>
<th>Incinerate (kg)</th>
<th>Landfill (kg)</th>
<th>Other (kg)</th>
<th>Total (kg)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Group I</td>
<td>0</td>
<td>96,960</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>96,960</td>
</tr>
<tr>
<td>Group II</td>
<td>38,745</td>
<td>19,260</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>58,005</td>
</tr>
<tr>
<td>Group III</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Group IV</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Group V</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Total</td>
<td>38,745</td>
<td>116,220</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>154,965</td>
</tr>
</tbody>
</table>

The majority of the waste material generated comprised of oils (23 tonnes), sludges, liquids and tank washings (59 tonnes), and special waste in the form of oily rags, filters and electrical equipment (15 tonnes) all of which were recycled. Nearly three quarters (74.99%) of all waste produced was recycled, compared to 43% during the 2010 offshore operations. Unlike the previous year’s operations, the waste involved could all be re-used or recycled, thus no waste had to be disposed of in landfill. Overall, a much lower quantity of waste was generated during 2011, with operations only covering a single well test which was carried out over a much shorter time period than activities conducted in 2010.

Standards of tidiness and sorting of waste was closely monitored by the Hurricane environmental representatives on the drilling rig throughout the 2011 operations and high standards were maintained. In future, Hurricane will continue to work with sub-contractors to ensure waste reduction is emphasised wherever possible and appropriate segregation and storage procedures continue to be followed.

A summary of the disposal routes for all wastes generated during Hurricane offshore operations over the last three years of activities (2009 to 2011) is presented in Figure 4.3. Comparison of the waste quantities and disposal routes between the three years are difficult as the duration and nature of operations and the drilling rigs used varied between the three years. However, Hurricane has endeavoured to encourage the implementation of measures to help manage and reduce waste generation over the course of offshore operations and it can be seen that the proportion of waste that was ultimately recycled or re-used has increased significantly over the three most recent years of operations.

Figure 4.3 Comparison of waste disposal from Hurricane offshore operations (2009 to 2011)
4.1.1. Atmospheric emissions

The main atmospheric emissions generated during Hurricane’s offshore operations in 2011 comprised of combustion emissions from the drilling rig and well test at the Whirlwind well. The total diesel fuel consumption of the drilling rig was approximately 363 tonnes, producing a total of approximately 1,728 tonnes of CO₂ equivalents.

During the well test conducted at Whirlwind a total of 169 tonnes of hydrocarbons were flared, of which 167.5 tonnes was from gas and 1.5 tonnes from oil. The well test activities produced approximately 659 tonnes of CO₂ equivalents. The atmospheric emissions generated from fuel consumption and well test operations are shown in Table 4.5. As the operations at Whirlwind had to be simplified, the quantities of hydrocarbons flared during the well test were reduced considerably from that originally planned. Therefore, combustion emissions generated by the WilPhoenix drilling rig comprised the majority of atmospheric emissions from the well.

| Table 4.5 Atmospheric emissions from the 2011 offshore operations |
|----------------------|----------------------|
|                      | Rig fuel consumption (kg) | Well test (kg) |
| **Consumption**      |                      |               |
| CO₂                  | 1,160,320             | 473,990       |
| NOₓ                  | 13,200                | 210           |
| N₂O                  | 80                    | 10            |
| SO₂                  | 136                   | 10            |
| CO                   | 3,010                 | 1,500         |
| CH₄                  | 40                    | 7,580         |
| VOC                  | 440                   | 880           |
| **Total CO₂ equivalents** | 1,727,650       | 658,650       |

In order to minimise atmospheric emissions from fuel combustion Hurricane implemented a number of control measures including:

- Ensuring all equipment and machinery was well maintained so as to be as fuel efficient as possible
- Selection of new, fuel efficient support vessels
- Logistics planned to reduce the number of supply vessel and helicopter trips
- Optimisation of flight paths for helicopter trips

Hurricane also implemented a number of measures to optimise the flaring efficiency and minimise the quantity of hydrocarbons flared during testing. These measures included:

- Best available, efficient flaring equipment
- Well test planned to minimise the duration of flaring as far as possible
- A well test supervisor was present throughout the test
- Real time monitoring equipment, which minimised flow periods whilst allowing for the necessary information to be gathered
5. **Offshore survey activities 2011**

In addition to the Whirlwind well re-entry and testing operations, Hurricane also conducted site and environmental surveys at two locations to the west of Shetland in 2011. These surveys covered the proven Lancaster field in Block 205/21a and the as yet undrilled Lincoln prospect in Block 205/26a. The two surveys took place consecutively between 7 and 27 August 2011. These surveys used digital, analogue and environmental sampling methods to characterise the nature of the local seabed and sub-surface conditions, to inform later drilling and development operations. As with the Whirlwind operations, an ENVID workshop was conducted to identify the potentially significant environmental impacts of the surveys, such as noise and interactions with other sea users, which involved personnel from Hurricane and the survey contractors. The impacts associated with the survey activities were considered to be largely minor and consistent with those from general shipping operations. However, over the course of the planning process for the operations, specific environmental control measures were identified and an Environmental Management Plan was developed to help monitor the fulfillment of these measures during the operations.