



**OSPAR**  
**COMMISSION**

*Protecting and conserving the  
North-East Atlantic and its resources*

# Assessment of discharges, spills and emissions from offshore oil and gas operations in Irish Waters from 2010 – 2014

### **OSPAR Convention**

The Convention for the Protection of the Marine Environment of the North-East Atlantic (the “OSPAR Convention”) was opened for signature at the Ministerial Meeting of the former Oslo and Paris Commissions in Paris on 22 September 1992. The Convention entered into force on 25 March 1998. The Contracting Parties are Belgium, Denmark, the European Union, Finland, France, Germany, Iceland, Ireland, Luxembourg, the Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and the United Kingdom.

### **Convention OSPAR**

La Convention pour la protection du milieu marin de l'Atlantique du Nord-Est, dite Convention OSPAR, a été ouverte à la signature à la réunion ministérielle des anciennes Commissions d'Oslo et de Paris, à Paris le 22 septembre 1992. La Convention est entrée en vigueur le 25 mars 1998. Les Parties contractantes sont l'Allemagne, la Belgique, le Danemark, l'Espagne, la Finlande, la France, l'Irlande, l'Islande, le Luxembourg, la Norvège, les Pays-Bas, le Portugal, le Royaume-Uni de Grande Bretagne et d'Irlande du Nord, la Suède, la Suisse et l'Union européenne.

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## Executive Summary

This report presents the discharge, spill and emission data for Irish offshore oil and gas operations during the period 2010 - 2014 and provides an assessment of those data. The data on which the assessment is based are provided in Appendix 2.

### a. Level of Activity

Levels of oil and gas activity offshore by Ireland, both production and exploration, have historically been low. During the period 2010-2014 there was only one gas production installation, though with multiple well inputs. (An additional gas production facility began operations at the end of 2015.) There is currently no oil production in Irish waters.

The total production of hydrocarbons from offshore Ireland during the period 2010 – 2014 decreased by 18%.

### b. Discharges & Spills of Oil

The total quantity of dispersed<sup>1</sup> oil (aliphatic oil) discharged to the sea from produced water and displacement water has remained stable at 0,02 to 0,03 tonnes per year.

Over the period of 2010 to 2014, more spilled oil found its way to the sea, than did dispersed oil discharged in produced water. It should be noted that the quantity of dispersed oil discharged by produced water in Irish waters is both relatively low and stable, therefore the main contributions to the total oil discharged varied from year to year, depending on the quantity of oil spilled in a year. There is no apparent trend.

The annual average dispersed oil content in produced water remained relatively stable at approximately 15 mg/l, apart from 2014 when it was calculated as 27 mg/l but was still below the current performance standard of 30 mg/l dispersed oil in produced water discharged to the sea. The performance standard was not exceeded during the reporting period.

Spills of oil to sea have varied over the period, as might be expected, ranging from 0,009 tonnes to 0,7 tonnes. As might be expected with accidental spills, there is no trend in the data.

### c. Chemicals

The total quantity of chemicals used offshore in 2014 was significantly lower than in 2010, but with no downward trend in between. The total quantity of chemicals discharged into the sea during the period 2010 – 2014 remained in the same order of magnitude, increasing some years and decreasing others depending on the level of drilling/completion activities. On average 98% (by weight) of the chemicals discharged over the assessment period were on the OSPAR PLONOR list<sup>2</sup> while less than 0,1% (by weight) of the total amount of chemicals discharged contained either substances on the OSPAR List of Chemicals for Priority Action (LCPA) or substances which are candidates for substitution.

OSPAR Recommendation 2005/2 set environmental goals for the reduction of discharges of LCPA substances, and discharges were to be phased out by 2010. This was achieved by Ireland, with no

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<sup>1</sup>. "Aliphatics" and "aromatics" are defined by the reference method set in OSPAR Agreement 1997-16 (Solvent extraction, Infra-Red measurement at 3 wavelengths). In that context, "aliphatics" and "dispersed oil" mean the same thing.

<sup>2</sup> Pose little or no risk to the environment - PLONOR

LCPA discharges in the assessment period. This compares well with the 97% reduction over the same period across the OSPAR area.

OSPAR Recommendation 2006/3 set environmental goals on the phasing out of discharges of chemicals that are, or which contain, substances identified as candidates for substitution<sup>3</sup> by 2017. In Irish waters, quantities of such chemicals used were generally decreasing during the period from 2010 – 2014, apart from an increase from drilling activity in 2013. Discharge of such substances fluctuated during the period due to drilling and well intervention activities.

#### **d. Atmospheric Emissions**

Atmospheric emissions from offshore oil and gas activities are not regulated by OSPAR measures, but are reported annually by operators. Emissions to the atmosphere have generally decreased or remained stable over the period, apart from 2013 where increases can be attributed to the increased diesel consumption required for dynamic positioning during drilling of a deep-water well.

#### **e. Concluding comment**

The level of activity from offshore industry in Ireland is considerably lower than in most other OSPAR Contacting Parties. As a result of this low level activity, any additional activity impacts significantly on the data and thus impacts on trends within.

The industry in Ireland is currently underdeveloped and therefore possibilities for further exploration or production activity in the future cannot be discounted. It is clear that any further developments are likely to lead to increases in discharges, emissions and spills of oil, chemicals and atmospheric emissions.

## Récapitulatif

Le présent rapport présente les données de l'Irlande sur les rejets, les déversements et les émissions pour les opérations pétrolières et gazières offshore durant la période 2010–2014 et l'évaluation des données. Les données annuelles sur lesquelles l'évaluation se fonde sont présentées dans l'appendice 2.

#### **Niveau d'activité**

Historiquement, le niveau d'activité pétrolière et gazière – production et exploration - de l'Irlande est bas. Durant la période de 2010 à 2014 il n'y a qu'une seule installation de production gazière, toutefois ayant plusieurs puits de production. (Une nouvelle installation de production gazière a commencé son activité à la fin de 2015). Pour l'heure il n'y a aucune production pétrolière dans les eaux irlandaises.

La production totale d'hydrocarbures en offshore Irlande durant la période 2010-2014 a diminué par 18%.

Le nombre d'installations en offshore dans les eaux irlandaises est resté pour l'essentiel statique au cours des dernières années, tandis que l'activité de forage a diminué depuis 2011.

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<sup>3</sup> Except for those chemicals where, despite considerable efforts, it can be demonstrated that this is not feasible due to technical or safety reasons.

## Rejets et déversements

La quantité totale d'hydrocarbures dispersés<sup>4</sup> (hydrocarbures aliphatiques) rejetée en mer dans l'eau de production est restée stable au niveau de 0,02 à 0,03 tonnes par an.

Pendant la période de 2010 à 2014, la quantité d'hydrocarbures déversée en mer est plus importante que la quantité d'hydrocarbures dispersés rejetée dans l'eau de production. Il est à noter que la quantité d'hydrocarbures dispersés rejetés dans l'eau de production dans les eaux irlandaises est relativement faible et reste stable, donc les contributions principales à la quantité totale d'hydrocarbures rejetée varient d'année en année, selon la quantité d'hydrocarbures déversés. Aucune tendance n'est évidente.

Le moyen annuel de la teneur d'hydrocarbures dispersés dans l'eau de production est resté relativement stable à approximativement 15 mg/l-1, à l'exception de 2014 quand il a été calculé à 27 mg/l-1. Ce chiffre est néanmoins au-dessous de la norme de performance actuelle de 30 mg/l-1 d'hydrocarbures dispersés dans l'eau production rejetée en mer. La norme de performance n'a pas été excédée pendant la période de notification.

Les déversements d'hydrocarbures pendant cette période varient, comme on peut s'y attendre, et vont de 0,009 tonnes à 0,7 tonnes. De nouveau, aucune tendance n'est décelée.

## Produits chimiques

La quantité totale de produits chimiques utilisée en 2014 est sensiblement inférieure à celle de 2010, mais on ne constate aucune tendance à la baisse entre ces dates. La quantité totale de produits chimiques rejetée en mer durant la période de 2010 à 2014 est restée du même ordre de grandeur, augmentant ou diminuant d'une année à l'autre selon le niveau des activités de forage/complétion. En moyenne 98% (par poids) des produits chimiques rejetés au cours de la période d'évaluation figurent sur la Liste PLONOR d'OSPAR,<sup>5</sup> tandis que moins de 0,1% (par poids) de la quantité totale des produits chimiques rejetée contiennent des substances sur la Liste OSPAR de produits chimiques devant faire l'objet de mesures prioritaires (LCPA) ou des substances qui sont candidates à la substitution.

La recommandation OSPAR 2005/2 établit des objectifs environnementaux applicables aux rejets de produits chimiques qui figurent sur la Liste OSPAR des produits chimiques devant faire l'objet de mesures prioritaires (LCPA), dont l'utilisation devait cesser en 2010. Cet objectif a été réalisé en Irlande, et aucun produit chimique de la LCPA n'a été rejeté pendant la période d'évaluation. Ce qui se compare favorablement à la réduction de 97% réalisée sur la même période dans l'ensemble de la zone OSPAR.

La recommandation OSPAR 2006/3 établit des objectifs environnementaux visant les rejets de produits chimiques et sont, ou qui contiennent des substances ayant été identifiées comme étant

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<sup>4</sup>. Les composés « aliphatiques » et « aromatiques » sont définis par la méthode de référence énoncée dans l'Accord OSPAR 1997-16 (Extraction par solvant, mesure par infrarouges à 3 longueurs d'onde). Dans ce contexte, les termes « aliphatiques » et « hydrocarbures dispersés » ont le même sens.

<sup>5</sup> Liste OSPAR de substances utilisées et rejetées en offshore, et considérées comme ne présentant que peu de risque pour l'environnement, voire aucun (PLONOR)

candidates à la substitution<sup>6</sup>. La recommandation prévoit la cessation du rejet de tels produits chimiques d'ici 2017. En générale dans les eaux irlandaises, la quantité de tels produits chimiques utilisés a diminué durant la période de 2010 à 2014, à l'exception d'une augmentation de l'activité de forage en 2013. Les rejets de telles substances varient pendant la période à cause des activités de forage et d'intervention sur puits.

### **Émissions atmosphériques**

Les émissions atmosphériques ne sont pas réglementées par des mesures OSPAR, mais elles sont notifiées une fois par an par les opérateurs. En général les émissions atmosphériques ont diminué ou sont restés stables pendant la période, à l'exception de l'an 2013, où l'augmentation peut être attribuée à la consommation élevée du gasoil nécessaire pour le positionnement dynamique pendant le forage des puits en eaux profondes.

### **Conclusion**

Le niveau d'activité offshore en Irlande est considérablement moins important par rapport à d'autres Parties contractantes d'OSPAR. Par conséquent, toute activité supplémentaire a des impacts significatifs pour les données et tendances.

L'industrie en Irlande est actuellement sous-développée et on ne peut pas exclure les possibilités d'activités d'exploration ou de production à l'avenir. Il est évident que les développements futurs sont susceptibles d'entraîner des augmentations dans les rejets, émissions et déversements d'hydrocarbures, de produits chimiques et d'émissions atmosphériques.

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<sup>6</sup> A l'exception des produits chimiques pour lesquels, malgré des efforts considérables, l'on peut démontrer que cela n'est pas réalisable pour des raisons techniques ou de sécurité. La démonstration de ces raisons devra inclure une description des efforts déployés à cet effet.

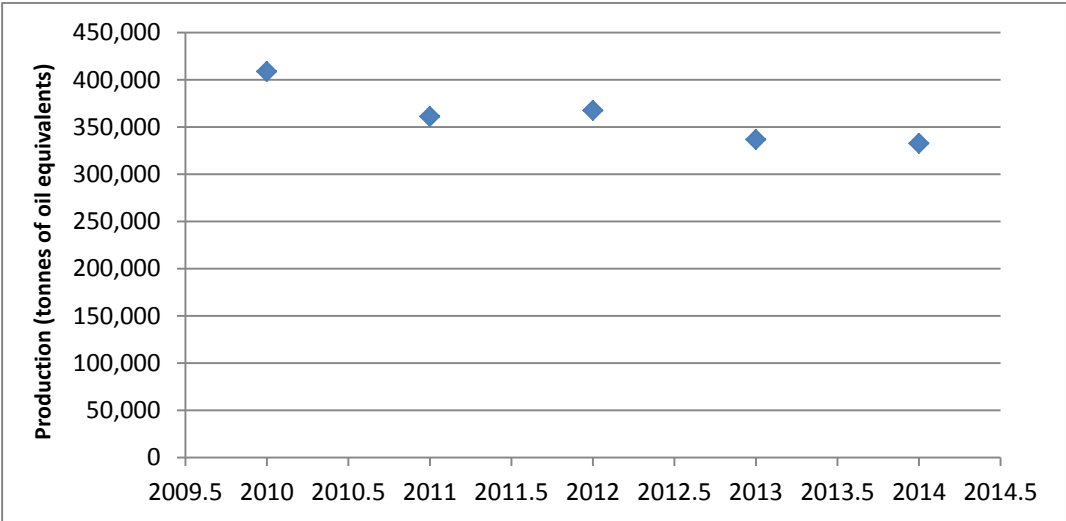
# 1.0 Background

This report provides an assessment of the discharges, spills and emissions to the environment from offshore oil and gas operations in the Irish sector of the OSPAR Maritime Area for the period 2010 – 2014. The purpose of this report is to assess increasing or decreasing trends in the quantities of such discharges, spills and emissions, taking account of the level of oil and gas activity in the sector, with the aim of demonstrating the effectiveness of OSPAR measures. Trends have been assessed using expert judgement and not by statistical analyses. This report does not seek to assess the impact on the environment of these discharges, spill and emissions.

This assessment is based on data submitted by Operators, and compiled and reported by Ireland in the annual OSPAR report on discharges, spills and emissions from offshore oil and gas installations. Data used in this assessment report are the best available data at the time of preparing the report, and are appended to this report for information at Appendix 2.

# 2.0 Setting the Scene

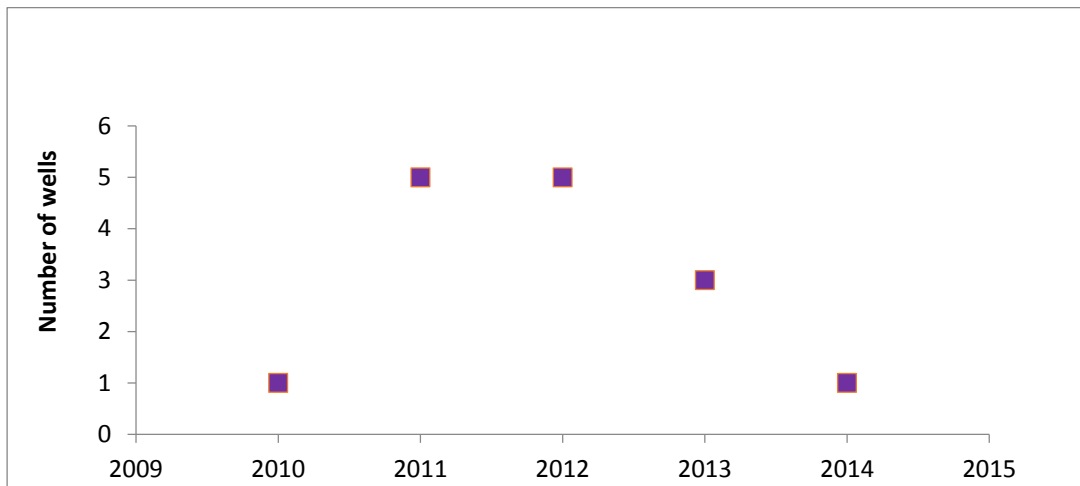
## 2.1 Level of Activity



**Figure 2.1:** Total offshore oil & gas production offshore Ireland, 2010-2014

Total production offshore Ireland showed a slight downward trend during the 2010 – 2014 period. The number of installations with emissions and discharges offshore Ireland remained stable at one during the period 2010 – 2014.





**Figure 2.2:** Number of wells drilled, appraised or re-entered and completed Offshore Ireland, 2010 – 2014

## 2.2 Environmental Management

OSPAR Recommendation 2003/5 to Promote the Use and Implementation of Environmental Management Systems by the Offshore Industry was introduced in 2003, with the goal that by the end of 2005 all operators within Contracting Parties jurisdiction should have in place an Environmental Management System that is in accordance with the principles of an internationally recognised standard (ISO14001 or EMAS). All operators working in Irish waters have an EMS in place.

## 3.0 Oil Discharges

### 3.1 Discharges of Oil to Sea

Dispersed oil is discharged in accordance with OSPAR Recommendation 2001/1 (as amended) which limits the dispersed oil concentration in produced and displacement water to  $30 \text{ mg l}^{-1}$ . With regard to produced and displacement water discharges, operators are required to ensure that concentrations of dispersed oil do not exceed  $30 \text{ mg l}^{-1}$  as a monthly average. Samples are taken at least monthly (discharge is less than 2 tonnes of dispersed oil per year).

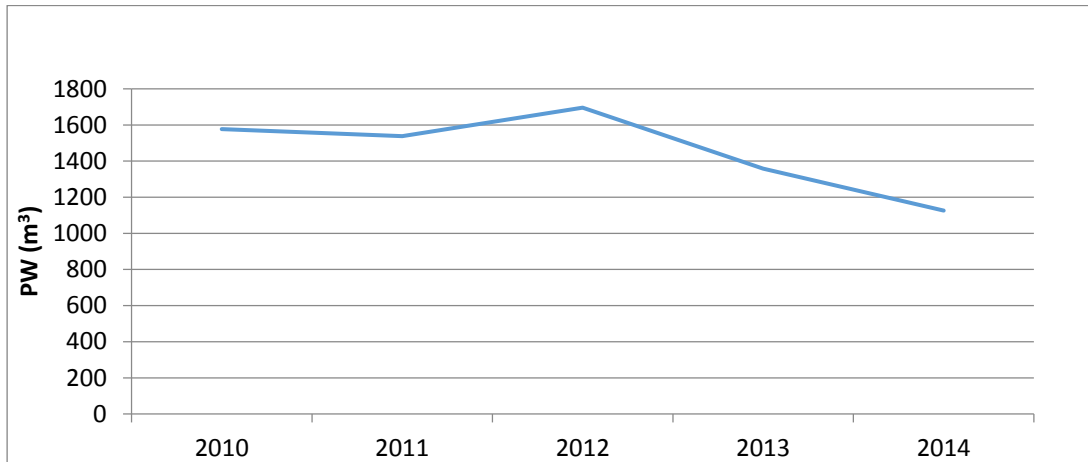
To determine the amount of dispersed oil discharged, operators are required to quantify the amount of produced water discharged from each installation. The overall measurement uncertainty must be within  $\pm 10\%$ .

The Recommendation also requires that Contracting Parties should ensure that plans to construct new offshore installations, or to modify substantially existing offshore installations, should take as a point of departure the minimisation of discharges.

#### 3.1.1 Produced & water

The discharge of produced water has generally declined over the period 2010 to 2014, with a decrease of 28% attributed to a decline in production. There is no displacement water discharged in Irish waters. ReInjection of produced water also does not take place in Irish waters.

It should be noted that as of December 2015, an additional gas production facility has come on line and is therefore expected to cause an increase in discharge of produced water and associated dispersed oil in the future.

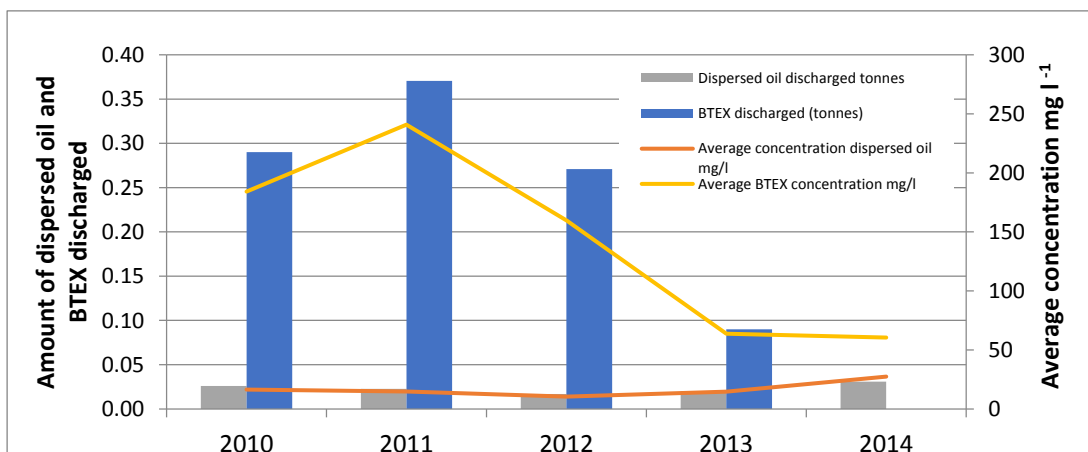


**Figure 3.1:** Discharge of produced water (m<sup>3</sup>), 2010-2014, offshore Ireland

### 3.1.2 Dispersed oil discharged

The total quantity of dispersed oil discharged with produced water remained stable at 0,2-0,3 tonnes over the period of assessment. The concentration of dispersed oil in produced water also remained stable at between 10 and 15 mg l<sup>-1</sup>, apart from an increase to 27 mg l<sup>-1</sup> in 2014, which was a result of maintenance work carried out on an oily water heater, confirming that individual issues can have an abnormally large influence on all results.

The average concentration of oil in PW discharges for the OSPAR area has remained fairly stable at 12,5 to 13 mg l<sup>-1</sup> from 2010 to 2014.



**Figure 3.2:** Quantity (in tonnes) and quality of oil discharged offshore Ireland, 2010-2014

Recommendation 2001/1 sets a performance standard for the discharge of dispersed oil in produced water. Since 2007 OSPAR has set the performance standard at 30 mg l<sup>-1</sup>. The quantity of dispersed oil discharged in excess of the performance standard during the reporting period 2010 to 2014 was zero.

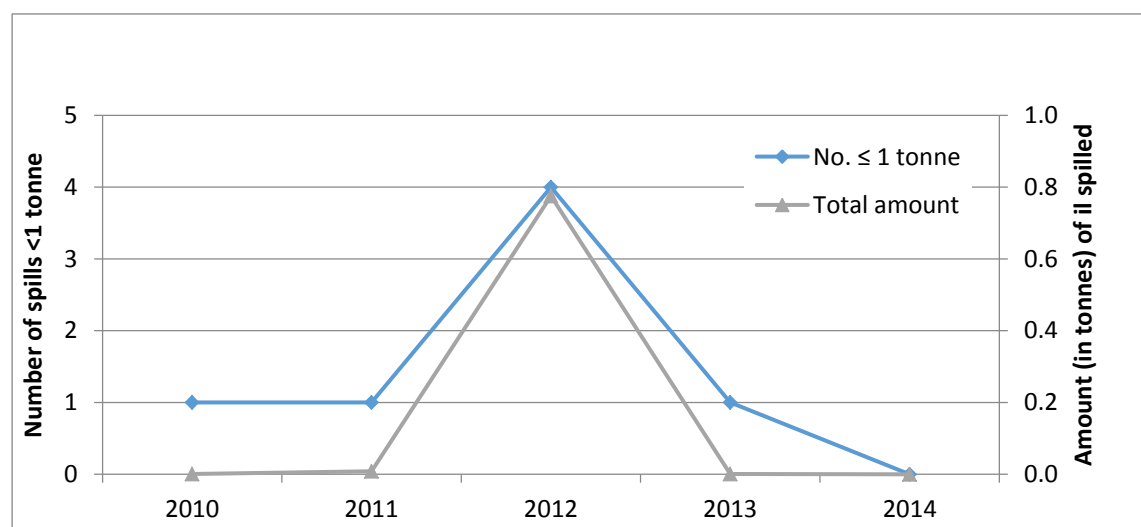
OSPAR does not regulate discharges of dissolved oil as the components are considered to rapidly biodegrade in seawater once discharged. Nevertheless, Contracting Parties report on these values annually. The discharge of dissolved oil<sup>7</sup> (BTEX) appears to be decreasing from 2010 – 2014 from 0,3 to 0,1 tonnes, however, it should be noted that the higher figures are following a period of increase, thought to be a result of a change in composition of condensate with a higher proportion of aromatics being detected than in previous years and a decrease in the concentration of the longer, straight-chain components.

### 3.2 Risk-based Approach (RBA)

In 2012, OSPAR Recommendation 2012/5 for a risk-based approach to the management of produced water discharges from offshore installations was adopted. All Contracting Parties are required to complete the RBA process for all installations discharging produced water by 2018. Ireland is in the process of developing an implementation plan for industry in Irish waters.

### 3.3 Spills of Oil to Sea

The number of oil spills to sea during the period 2010 – 2014 has varied year on year ranging from 0 to 4. All oil spills were less than 1 tonne with quantities ranging from 1 kg to 0,7 tonnes in any year. Due to the accidental nature of spills, there is no apparent trend in the data. The number of spills and quantity spilled varies greatly across the OSPAR region and comparison of performance is not possible.



**Figure 3.3:** Number of oil spills and quantity of oil spilled (in tonnes) offshore Ireland, 2010-2014

### 3.4 Discharges of Organic Phase Fluids

OSPAR Decision 2000/3 aims to prevent and eliminate pollution resulting from the use and discharge of OPF and OPF-contaminated cuttings<sup>8</sup> and prohibits the discharge of cuttings contaminated with OBF<sup>9</sup> at a concentration greater than 1% by weight on cuttings.

<sup>7</sup> "Aliphatics" (or "dispersed oil") are regularly and frequently measured, while the sampling is much less frequent for "aromatics". Therefore data on "aromatics" may be less reliable.

<sup>8</sup> OPF = Organic-phase Drilling Fluids

<sup>9</sup> OBF = Oil-based fluids

Although the development of thermal desorption technologies (Roto-mill, hammer mill, etc.), which readily achieve less than the 1% concentration limit has generated interest and some research activity, to date no OPF-contaminated cuttings have been discharged to sea in Ireland.

## 4.0 Chemicals

Since 2001 the use and discharge of offshore chemicals have been covered by a number of OSPAR measures, as listed in the Appendix 1. The regulations require that all use and discharge of offshore chemicals requires a permit, with the permit application setting out the conditions for use and discharge, and the quantities of chemicals to be used and discharged. These measures are implemented in Ireland through the Permit for Use and Discharge of Added Chemicals (PUDAC), currently issued by the Department of Communications, Energy and Natural Resources (DCENR). Like other OSPAR contacting parties Ireland uses the OSPAR Harmonised Mandatory Control Scheme (HMCS) and the Chemical Hazard and Risk Management (CHARM) model to rank chemical products for use and discharge offshore.

In this report the term *substitution chemical* refers to chemicals which are, or contain, substances identified as candidates for substitution, according to OSPAR Recommendation 2010/4. This includes chemicals or substances which are:

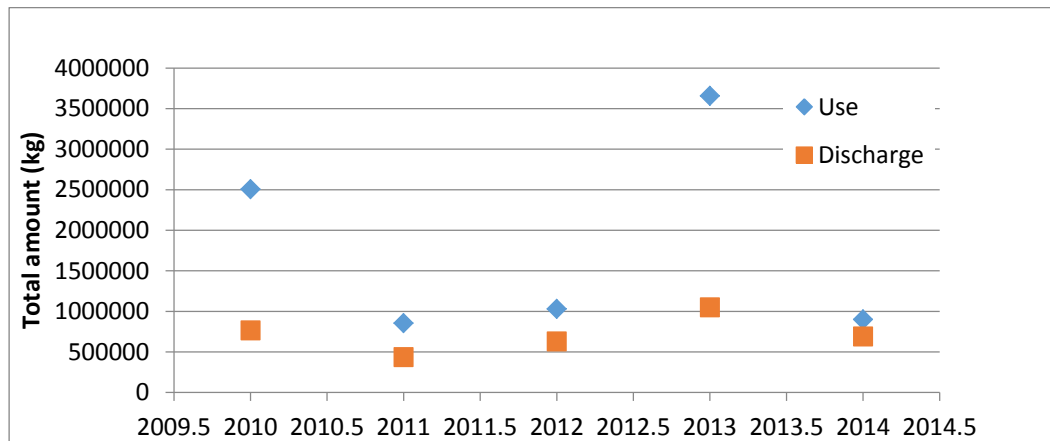
- on the OSPAR LCPA,
- inorganic with LC<sub>50</sub> or EC<sub>50</sub> less than 1 mg l<sup>-1</sup>,
- have biodegradation less than 20%, or
- meets two of three criteria
  - biodegradation less than 60%,
  - BCF larger than 100 or Log P<sub>ow</sub> ≥ 3, or
  - LC<sub>50</sub>/EC<sub>50</sub> less than 10 mg l<sup>-1</sup>.

The goal of OSPAR Recommendation 2006/3 is for discharges of substitution chemicals to be phased out by 2017, although an exception can be made for chemicals with no functional equivalent.

The goal of OSPAR Recommendation 2005/2 was that the discharge of chemicals on the OSPAR List of Chemicals for Priority Action (LCPA) would be phased out by 1 January 2010. No chemicals from the LCPA list have been discharged offshore Ireland during the assessment period.

### 4.1 Chemical Use & Discharge

Total use and discharge of chemicals between 2010 and 2014 shows no obvious trend. While there is a marked difference between the amount used and discharged in 2010 and the amount used and discharged in 2014, usage and discharge in the intervening years shows no discernible trend. The absence of any trend is largely attributable to the level of drilling and well intervention activity, which varies little year on year but nonetheless can greatly influence total figures.



**Figure 4.1:** Total chemical use and discharge offshore Ireland 2010-2014 (kg)

#### 4.1.1 Chemicals used

The highest quantity of chemicals used and discharged over the reporting period was in 2013. In that year, the quantity of chemicals used offshore was 3656 tonnes. Of that quantity, 76% (by weight) of the chemicals were on the PLONOR list and 22% (by weight) were classed as substitution chemicals.

Figures for 2010 (with next highest total use at 2507 tonnes) are that again, 76% (by weight) were PLONOR chemicals while 1% (by weight) was classed as substitution chemicals.

#### 4.1.2 Chemicals discharged

The highest quantity of chemicals used and discharged over the reporting period was in 2013. In that year, the quantity discharged was 1049 tonnes. Of that quantity, 99% (by weight) of the chemicals were on the PLONOR list and just 0,3% (by weight) were classed as substitution chemicals.

Figures for 2010 (with next highest discharge at 765 tonnes) are that again, almost 99% (by weight) were PLONOR chemicals while 0,01 (by weight) were classed as substitution chemicals.

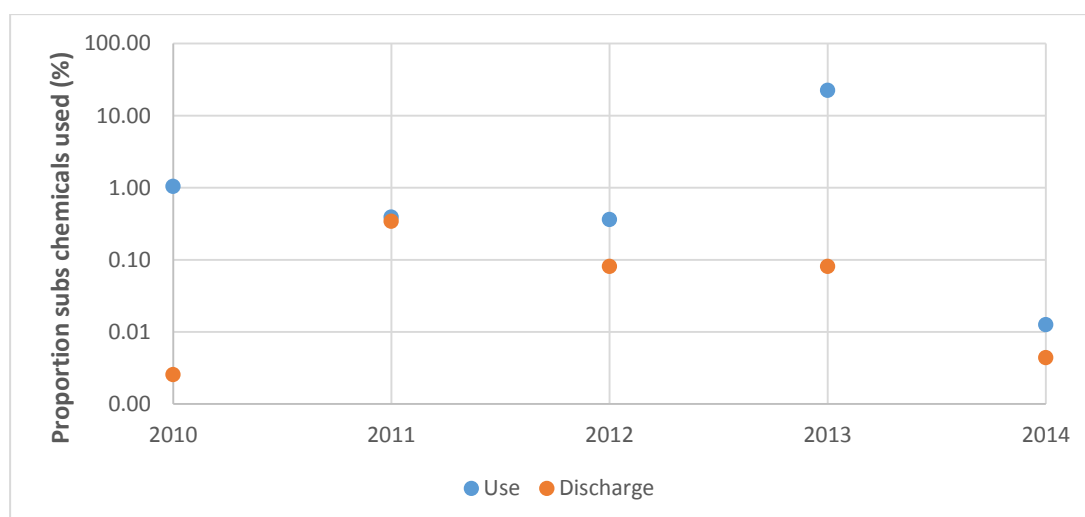
#### 4.1.3 LCPA chemicals and candidates for substitution

The use of LCPA substances is rare in the reporting period 2010 – 2014, with just 2 kg was used in 2013, but with no discharge.

Use of other chemicals carrying substitution warnings varied in quantity, depending on the amount of drilling activity in a given year but the proportion of chemicals carrying substitution warnings discharged was never more than 0,3% over the assessment period and showed a slight but perceptible downward pattern over the last four years, apart from 2013 (see Table 4.1 and Figure 4.2, below).

**Table 4.1: Use and discharge of chemicals identified as candidates for substitution, 2010-2014**

Year	Total chemical use	Total chemical discharge	% substitution chemicals used	% substitution chemicals discharged
2010	2 507 050	765 591	1,0	0,003
2011	853 150	434 725	0,4	0,3
2012	1 029 099	629 518	0,4	0,1
2013	3 656 277	1 049 399	22,4	0,1
2014	899 873	689 296	0,01	0,004



**Figure 4.2:** Substitution chemicals as proportion of total chemicals used and discharged (%), 2010 - 2014. (Note logarithmic scale on y-axis.)

## 4.2 Chemical Spills

The number of chemical spills to sea during the period 2010 – 2014 ranged from 0 to 2 per year. The total quantity of chemicals spilled ranged from 15 millilitres to 5 tonnes, with just one spill greater than 1 tonne, and contributing more than 96% of the total chemicals spilled in Irish waters (see Figure 4.3). As previously explained, the limited size of the offshore oil and gas industry in Ireland means that discharges are generally relatively small, and thus spills impact significantly on the total amount of oil or chemicals reaching the marine environment. No conclusions can be drawn from the frequency or quantity of spills, either in the Ireland or across the OSPAR region.

The largest proportion of chemical spilled (see above) was low toxicity oil-based drilling mud, and was predominantly composed of PLONOR substances, followed by substitution chemicals and inorganic substances. During the period 2010 – 2014 there were no spills of LCPA chemicals.

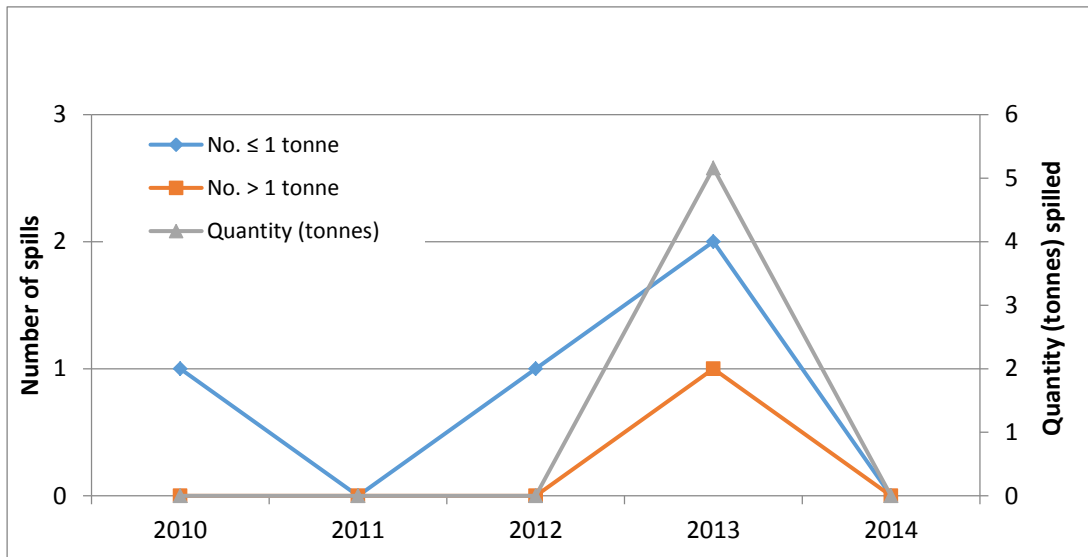


Figure 4.3: Chemical spills offshore Ireland, 2010-2014

## 5.0 Emissions to Air

Atmospheric emissions are not covered by OSPAR measures or harmonised measuring methodologies, but atmospheric pollutants are reported to OSPAR and, for larger installations, are regulated under relevant EU Directives. Consistency and quality of the data reported have undoubtedly improved over the past few years, particularly with regard to CO<sub>2</sub> emissions that are independently verified as required under of the EU ETS Directive.

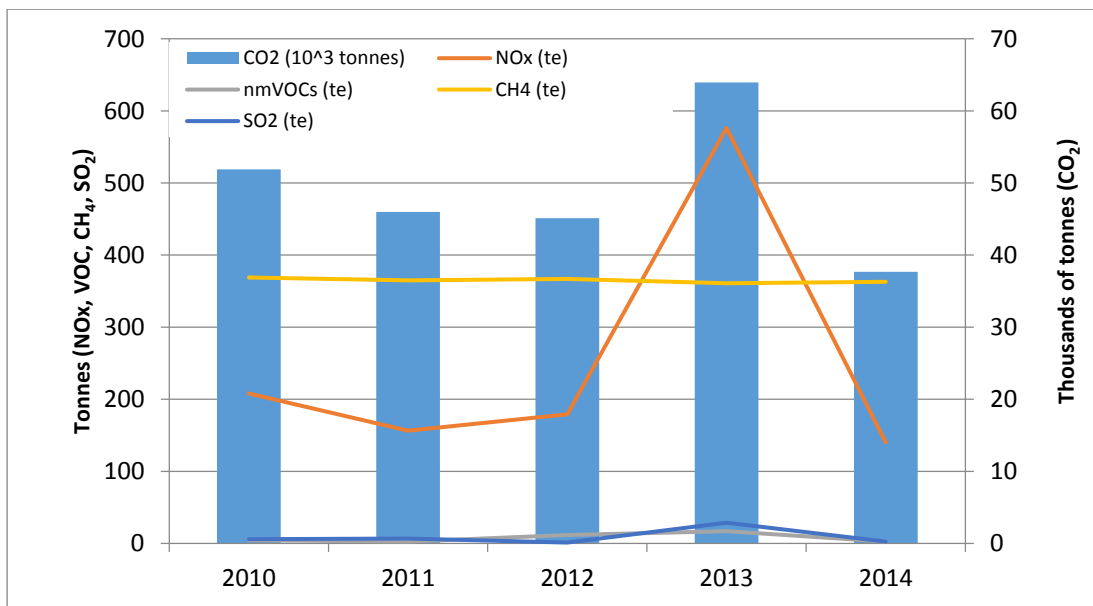


Figure 5.1: Emissions to atmosphere from offshore oil and gas activities in Irish waters, 2010-2014

The majority of atmospheric emissions were generally stable, with the exception of NO<sub>x</sub> which peaked in 2013. This was due a deep-water drilling operation being carried out using dynamic positioning and reflect the impacts that are made by individual activities on a small scale industry.

## 6.0 Additional notes

### 6.1 Counting of Installations

There are some differences in the manner in which Contracting Parties count installations. In Ireland, the number of installations submitted to OSPAR is arrived at by counting the number of installations with a discharge. This discharge point may represent a cluster of wells. A storage platform would be counted as “other”.

For exploration work, activities towards completion of wells and well intervention activities are included under number of wells drilled.

### 6.2 Reporting of Dispersed Oil

In Ireland, offshore operators are required to quantify the amount of produced and displacement water discharged and determine the concentration of dispersed oil in the discharge.

The concentration of dispersed oil is determined by sampling the discharge stream on a routine basis and analysing the samples in accordance with OSPAR Guidance. Operators are required to sample discharge streams at least monthly for installations with discharges of less than 2 tonnes dispersed oil per year. In practise, the frequency is much higher.

Dispersed oil discharges are reported annually through OSPAR Reporting Format to DCENR. Reports are examined; any anomalies are investigated and efforts made to remedy.

Analyses for this report were carried out using infra-red techniques. It is anticipated that reporting of analysis will be in line with the GC-FID OSPAR Reference method, for data from 2015.

### 6.3 Reporting of Chemical Use & Discharge

Operators in Irish waters are required to record the use and discharge of all offshore chemicals included in their chemical permits, in accordance with the terms and conditions of their Permit for Use and Discharge of Added Chemicals (PUDAC), which is issued by the Department of Communications, Energy and Natural Resources (DCENR). Operators are required to report to DCENR and the Marine Institute (MI) within a month of completion of specific activities on chemicals used and discharged. In general, consumption of chemicals from stock tanks and sack stores on board the installation are recorded daily and provide a fairly accurate measurement.

Chemical use and discharge is subject to verification by way of inspection. The operators’ chemical management systems, methods of reporting and other environment aspects of operations are also reviewed during offshore inspections.

### 6.4 Reporting of Atmospheric Emissions

Operators are required to report atmospheric emissions on an annual basis.



Measurement varies depending upon the type of emission, for example fuel gas used for combustion equipment and flare will usually be metered, although installations that are not included in the EU ETS may use a mass balance approach based on the amount of gas produced vs the amount exported, flared and consumed.

Diesel consumption is typically quantified by the measured reduction in tank levels on a daily basis. Atmospheric emissions are determined using standard emission factors based upon the fuel used, with samples taken to determine the composition of fuel gas on a quarterly basis.

Emissions reported are reviewed to identify any unusual results, *e.g.* several recent reports required amending due to discrepancies in inclusions to the report.

## Appendix 1: OSPAR Measures associated with Offshore Oil and Gas industry

### **Discharges contaminated with oil**

PARCOM Recommendation 86/1 of a 40 mg l<sup>-1</sup> Emission Standard for Platforms<sup>10</sup>;

OSPAR Reference Method of Analysis for the Determination of the Dispersed Oil Content in Produced Water (OSPAR Agreement number: 2005-15);

OSPAR Recommendation 2001/1 for the Management of Produced Water from Offshore Installations (as amended);

OSPAR Recommendation 2012/5 for a risk-based approach to the Management of Produced Water Discharges from Offshore Installations

### **Use and discharge of drilling fluids and cuttings**

OSPAR Decision 2000/3 on the Use of Organic-phase Drilling Fluids (OPF) and the Discharge of OPF-contaminated Cuttings;

Guidelines for the Consideration of the Best Environmental Option for the Management of OPF-Contaminated Cuttings Residue (OSPAR Agreement number: 2002-8);

### **Chemicals used and discharged offshore**

OSPAR Decision 2000/2 on a Harmonised Mandatory Control System for the Use and Reduction of the Discharge of Offshore Chemicals (as amended);

OSPAR Recommendation 2010/4 on a Harmonised Pre-Screening Scheme for Offshore Chemicals;

OSPAR Recommendation 2010/3 on a Harmonised Offshore Chemical Notification Format (HOCNF) (as amended);

OSPAR Recommendation 2006/3 on Environmental Goals for the Discharge by the Offshore Industry of Chemicals that Are, or Which Contain Substances Identified as Candidates for Substitution;

OSPAR Recommendation 2005/2 on Environmental Goals for the Discharge by the Offshore Industry of Chemicals that Are, or Contain Added Substances, Listed in the OSPAR 2004 List of Chemicals for Priority Action.

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<sup>10</sup> PARCOM Recommendation of a 40 mg l<sup>-1</sup> Emission Standard for Platforms, 1986 was revoked for produced water only by OSPAR Recommendation 2001/1 for the Management of Produced Water from Offshore Installations. However, this measure is still applicable in relation to ballast water, drainage water and displacement water from offshore installations.

## Appendix 2: Data Annexes

**Table 1b: Number of installations by type in the Irish maritime area with discharges to the sea, or emissions to the air, 2010-2014**

Year	2010	2011	2012	2013	2014
Production - Gas	1	1	1	1	1
Drilling /completion works	1	5	5	3	1
Other (storage)	1	1	1	1	1

**Table 2: Oily aqueous discharges to the maritime area<sup>11</sup>**

Year	No. of installations	Produced water discharged m <sup>3</sup>	Average concentration dispersed oil mg l <sup>-1</sup>	Dispersed oil discharged tonnes	Average BTEX concentration mg l <sup>-1</sup>	BTEX discharged mg l <sup>-1</sup>
<b>2010</b>	1	1 577	16	0,03	184	0,29
<b>2011</b>	1	1 538	15	0,02	241	0,37
<b>2012</b>	1	1 696	10	0,02	160	0,27
<b>2013</b>	1	1 359	15	0,02	64	0,09
<b>2014</b>	1	1 126	27	0,03	60	0,07

**Table 3: Use and discharges of organic-phase drilling fluids (OPF) and cuttings**

<sup>11</sup> Measured by IR

**Table 4a: Quantities of oil and other organic-phase fluids discharged via cuttings (in tonnes), 2003-2012**

<b>Year</b>	<b>Total amount of OPF used (tonnes)</b>	<b>Number of wells</b>	<b>Number of wells reinjecting cuttings</b>	<b>Cutting transported to shore (tonnes)</b>
<b>2010</b>	356,6	1	0	1 727,8
<b>2011</b>	0	0	0	0
<b>2012</b>	548	1	0	348
<b>2013</b>	2 977	1	0	1 540
<b>2014</b>	0	0	0	0

**Table 5: Spillage of oil and chemicals****Table 5a: Number of oil spills, and quantity of oil spilled, 2010-2014**

<b>Year</b>	<b>No. of oil spills</b>		<b>Quantity of oil spilled (tonnes)</b>	
	<b>No. ≤ 1 tonne</b>	<b>No. &gt; 1 tonne</b>	<b>Quantity (tonnes)</b>	<b>Quantity &gt; 1 tonne</b>
<b>2010</b>	1	0	0,001	0
<b>2011</b>	1	0	0,008	0
<b>2012</b>	4	0	0,775	0
<b>2013</b>	1	0	0,001	0
<b>2014</b>	0	0	0,000	0

**Table 5b: Number of chemicals spills, and quantity of oil spilled, 2010-2014**

Year	No. of chemicals spills		Quantity of chemicals spilled (tonnes)	
	No. ≤ 1 tonne	No. > 1 tonne	Quantity ≤ 1 tonne	Quantity > 1 tonne
2010	1	0	0,0003	0
2011	0	0	0	0
2012	1	0	0,00001	0
2013	2	1	0,0508	5,1
2014	0	0	0	0

**Table 6: Emissions to air, 2010-2014 (tonnes)**

Year	CO <sub>2</sub>	NO <sub>x</sub>	nmVOCs	CH <sub>4</sub>	SO <sub>2</sub>
2010	51,9 x 10 <sup>3</sup>	208	4,5	369	6,0
2011	46,0 x 10 <sup>3</sup>	157	2,7	365	6,9
2012	45,1 x 10 <sup>3</sup>	179	12	367	1,4
2013	63,9 x 10 <sup>3</sup>	576	17	361	29
2014	37,7 x 10 <sup>3</sup>	140	2,6	363	2,7

**Table 7: The use and discharge of offshore chemicals, 2010-2014****Table 7a: Quantity of offshore chemicals used in kg/year**

Pre-screening category	2010	2011	2012	2013	2014
PLONOR	1 904 711	836 840	936 836	2 783 230	878 846
List of Chemicals for Priority Action	0	0	0	2	0
Inorganic LC50 or EC50 < 1 mg l <sup>-1</sup>	0	0	7.98	400	0
Biodegradation < 20%	22 790	0	300	2 275	6
Substance meets two of three criteria	3 340	3 316.69	3 400	815 176	107
Inorganic, LC50 or EC50 > 1 mg l <sup>-1</sup>	3 944	0	0	53 685.2	0
Ranking	572 265	12 992.5	88 555.4	1 509	20 914.6
Total	2 507 050	853 150	1 029 099	3 656 277	899 873

**Table 7b: Quantity of offshore chemicals discharged in kg/year**

Pre-screening category	2010	2011	2012	2013	2014
PLONOR	754 568	423 274	604 132	1 040 237	673 680
List of Chemicals for Priority Action	0	0	0	0	0
Inorganic LC50 or EC50 < 1 mg l <sup>-1</sup>	0	0	0,798	0	0
Biodegradation < 20%	64	0	100	11	5.9
Substance meets two of three criteria	0	2 916.69	730	2 945	33.6
Inorganic, LC50 or EC50 > 1 mg l <sup>-1</sup>	2 207	0	0	4 697	0
Ranking	8 751.75	8 534.38	24 555.4	1 509	15 576.5
Total	765 591	434 725	629 518	1 049 399	689 296

\* Chemicals for substitution

**Table 7c: Chemicals spilled in kg per year**

<b>Pre-screening category</b>	<b>2010</b>	<b>2011</b>	<b>2012</b>	<b>2013</b>	<b>2014</b>
PLONOR	0	0	0	2 510	0
List of Chemicals for Priority Action	0	0	0	0	0
Inorganic LC50 or EC50 < 1 mg l <sup>-1</sup> *	0	0	0	0	0
Biodegradation < 20% *	0	0	0	0	0
Substance meets two of three criteria *	0	0	0	2 220	0
Inorganic, LC50 or EC50 > 1 mg l <sup>-1</sup>	0	0	0	400	0
Ranking	0	0	0.00001	0	0
Total	0	0	0	5 130	0

\* Chemicals for substitution

**Table 8: Total production offshore Ireland in tonnes of oil equivalents, (toeq)**

<b>Total Production (toeq)</b>	
<b>2010</b>	<b>408 678</b>
<b>2011</b>	<b>361 130</b>
<b>2012</b>	<b>367 540</b>
<b>2013</b>	<b>336 618</b>
<b>2014</b>	<b>332 647</b>



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