



OSPAR
COMMISSION

Ireland Assessment of Discharges, Spills and Emissions from Offshore Oil and Gas Installations in 2013 -17



DRAFT ASSESSMENT OF THE DISCHARGES, SPILLS AND EMISSIONS FROM OFFSHORE OIL AND GAS OPERATIONS IN IRISH WATERS FROM 2010 TO 2017

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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 - 2017 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 drilling and production activity offshore for Ireland have historically been low. Up to 2015 there was just one gas production installation, though with multiple well inputs from three gas fields. An additional gas production facility began operations at the end of 2015 but did not discharge produced water to sea over the period of this report. There is currently no oil production in Irish waters.

The total production of gas from offshore Ireland during the period 2010 – 2015 decreased by nearly 30%, however production has increased approximately five-fold since then due to the coming on-line of the second installation.

B. DISCHARGES & SPILLS OF OIL

The total quantity of dispersed¹ oil (aliphatic oil) discharged to the sea from produced water and displacement water has remained stable at around 0.02 tonnes per year.

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 remained relatively low but 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 had remained relatively stable from 2010 to 2013 at approximately 15 mg l⁻¹. In 2014, the concentration of oil in produced water rose to 27 mg l⁻¹ but levels in 2015 were back down to previous concentrations. All levels were below the current performance standard of 30 mg l⁻¹ dispersed oil in produced water discharged to the sea and so the OSPAR performance standard was consistently achieved over the reporting period.

Quantities of oil spilled were low, ranging from 0.0 to 0.01, with one incident in 2012 of 0.7 tonnes. Amounts varied over the period, as might be expected. There is no trend in the data.

C. CHEMICALS

The total quantity of chemicals discharged into the sea during the period 2010 – 2017 remained in the same order of magnitude, increasing some years and decreasing others depending on the level

¹. "Aliphatics" and "aromatics" are defined by the reference method set in OSPAR Agreement 2005-15 (Solvent extraction, Infra-Red measurement at 3 wavelengths). In that context, "aliphatics" and "dispersed oil" mean the same thing.

of drilling activities. On average about 90% (by weight) of the chemicals discharged over the assessment period were on the OSPAR PLONOR list², while an average of less than 1% (by weight) of the total amount of chemicals discharged contained 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 LCPA discharges in the assessment period.

OSPAR Recommendation 2006/3 set environmental goals on the phasing out of discharges of chemicals that are, or contain, substances identified as candidates for substitution³ by 2017. In Irish waters, quantities of such chemicals used generally decreased during the period from 2010 - 2016. Discharge of such substances increased in 2017 due to hydraulic valve operations. As no other activity was underway in 2017, this increase has more relative impact.

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 had generally decreased or remained stable over much of the period, apart from 2013 where increases were attributed to the increased diesel consumption required for dynamic positioning (DP) during drilling of a deep-water well. A slight increase also occurred in 2017, again due to DP drilling operation.

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 any trends within.

The industry in Ireland is currently immature and therefore possibilities for further exploration or production activities in the future cannot be discounted.

RÉCAPITULATIF

Le présent rapport comporte des données portant sur les rejets, déversements et émissions provenant des activités pétrolières et gazières offshore de l'Irlande entre 2010 et 2017 ainsi que leur évaluation. Les données sur lesquelles se fonde l'évaluation se trouvent dans l'appendice 2.

² Poses little or no risk to the environment - PLONOR

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

A. NIVEAU D'ACTIVITE

Le niveau des activités irlandaises de production et de forage pétroliers et gaziers offshore est historiquement bas. Il n'existait en 2015 qu'une seule installation de production de gaz bien que plusieurs puits de trois gisements de gaz y contribuent. Une installation de production de gaz supplémentaire a commencé des activités d'exploration fin 2015 mais n'a pas rejeté d'eau de production en mer au cours de la période concernée. Il n'existe actuellement aucune production d'hydrocarbures dans les eaux irlandaises.

La production gazière irlandaise totale offshore a diminué de presque 30% entre 2010 et 2015 mais elle a ensuite pratiquement quintuplé, une deuxième installation ayant été mise en opération.

B. REJETS ET DEVERSEMENTS D'HYDROCARBURES

La quantité totale d'hydrocarbures dispersés⁴ (hydrocarbures aliphatiques) rejetés en mer dans l'eau de production et l'eau de déplacement est demeurée stable, s'élevant à environ 0,02 tonnes par an.

La quantité d'hydrocarbures dispersés par l'eau de production dans les eaux irlandaises est relativement faible et stable, les principales contributions à la quantité totale d'hydrocarbures rejetés sont donc demeurées relativement faibles tout en variant d'une année à l'autre, selon la quantité d'hydrocarbures déversés au cours d'une année. Aucune tendance apparente n'est révélée.

La teneur annuelle moyenne d'hydrocarbures dispersés dans l'eau de production est demeurée relativement stable entre 2010 et 2013, s'élevant à environ 15 mg/l⁻¹. En 2014, la teneur en hydrocarbures dans l'eau de production a atteint 27 mg/l⁻¹ mais en 2015 les niveaux sont redescendus à celui des teneurs antérieures. Tous les niveaux étaient inférieurs à la norme de performance actuelle de 30 mg/l⁻¹ d'hydrocarbures de dispersion dans l'eau de production rejetée en mer et la norme de performance OSPAR a donc été systématiquement respectée au cours de la période de notification.

Les quantités d'hydrocarbures déversés ont été faibles, allant de 0,0 à 0,01, un incident de 0,7 tonnes s'étant produit en 2012. Les quantités varient évidemment au cours de la période. Les données ne révèlent aucune tendance.

C. PRODUITS CHIMIQUES

La quantité totale de produits chimiques rejetés en mer entre 2010 et 2017 demeure du même ordre, plus élevée certaines années et plus faible d'autres selon l'ampleur des activités de forage. Environ 90% (en poids) des produits chimiques rejetés au cours de la période d'évaluation figurent

⁴ Les hydrocarbures « aliphatiques » et « aromatiques » sont définis par la méthode de référence énoncée dans l'Accord OSPAR 2005-15 (Extraction par solvant, mesure par infrarouges à 3 longueurs d'onde). Dans ce contexte, les termes « hydrocarbures aliphatiques » et « hydrocarbures dispersés » ont le même sens.

sur la Liste PLONOR d'OSPAR ⁵ alors qu'en moyenne moins de 1% (en poids) de la quantité totale des produits chimiques rejetées contenaient des substances candidates à la substitution.

La Recommandation OSPAR 2005/2 fixe des objectifs environnementaux pour la réduction des rejets de substances figurant sur la Liste OSPAR de produits chimiques devant faire l'objet de mesures prioritaires (LCPA), qui devaient être éliminés progressivement d'ici à 2010. L'Irlande y est parvenue, aucun rejet de LCPA ne s'étant produit au cours de la période d'évaluation.

La Recommandation OSPAR 2006/3 fixe des objectifs environnementaux pour l'élimination progressive des produits chimiques offshore qui sont, ou qui contiennent, des substances identifiées comme candidates à la substitution⁶ d'ici 2017. Les quantités de telles substances utilisées dans les eaux irlandaises ont diminué dans l'ensemble entre 2010 et 2016. Les rejets de telles substances ont augmenté en 2017 des soupapes hydrauliques ayant été utilisées. Cette augmentation a plus d'impact relatif dans la mesure où aucune autre activité n'a eu lieu en 2017.

D. EMISSIONS ATMOSPHERIQUES

Les émissions atmosphériques provenant des activités pétrolières et gazières offshore ne sont pas réglementées par les mesures OSPAR mais elles sont notifiées tous les ans par les opérateurs. Dans l'ensemble, les émissions atmosphériques ont diminué ou sont demeurées stables pour la plus grande part de la période, à l'exception de 2013 lorsque les augmentations ont été attribuées à l'augmentation de la consommation de diesel nécessaire au positionnement dynamique (DP) durant le forage d'un puits en eaux profondes. Une légère augmentation s'est également produite en 2017, à nouveau due au DP au cours d'activités de forage.

E. CONCLUSION

Le niveau d'activité de l'industrie de l'offshore en Irlande est beaucoup plus faible que celui de la plupart des autres Parties contractantes OSPAR. L'impact de toute activité supplémentaire sur les données est donc significatif et par conséquent sur les tendances qu'elles révèlent.

Cette industrie n'est pas actuellement parvenue à maturité en Irlande et l'on ne peut donc pas exclure des possibilités ultérieures d'exploration ou de production à l'avenir.

⁵ Présente peu, voire pas, de risque pour l'environnement - PLONOR

⁶ A l'exception des substances chimiques pour lesquelles, en dépit d'efforts considérables, on peut démontrer que ceci n'est pas réalisable pour des raisons techniques et de sécurité.

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 – 2017. Although the requirement was to assess data from 2013 – 2017, the additional period has been included to provide a better reference line. 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 E&P 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 included at Appendix 2.

2.0 SETTING THE SCENE

2.1 LEVEL OF ACTIVITY

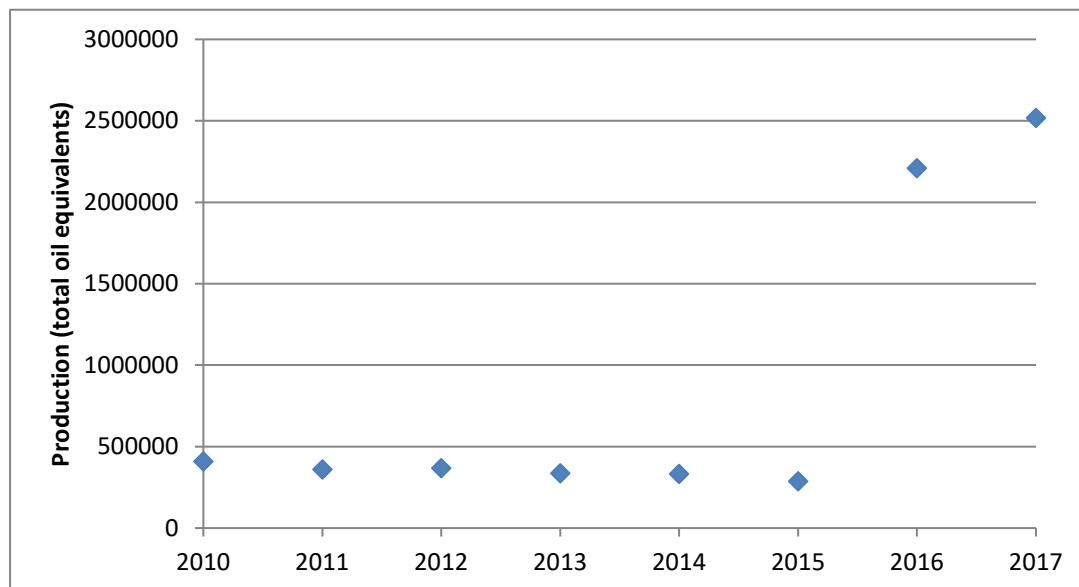


Figure 2.1 – Total offshore oil & gas production offshore Ireland, 2010-2017

Total production offshore Ireland showed a slight downward trend during the 2010-2015 period but with the coming on-line of a fourth gas field in late 2015 the trend has been reversed. The number of installations with emissions and discharges offshore Ireland remained stable at one during the period 2010 – 2017. The second facility is which located onshore did not discharge produced water offshore during this reporting period.

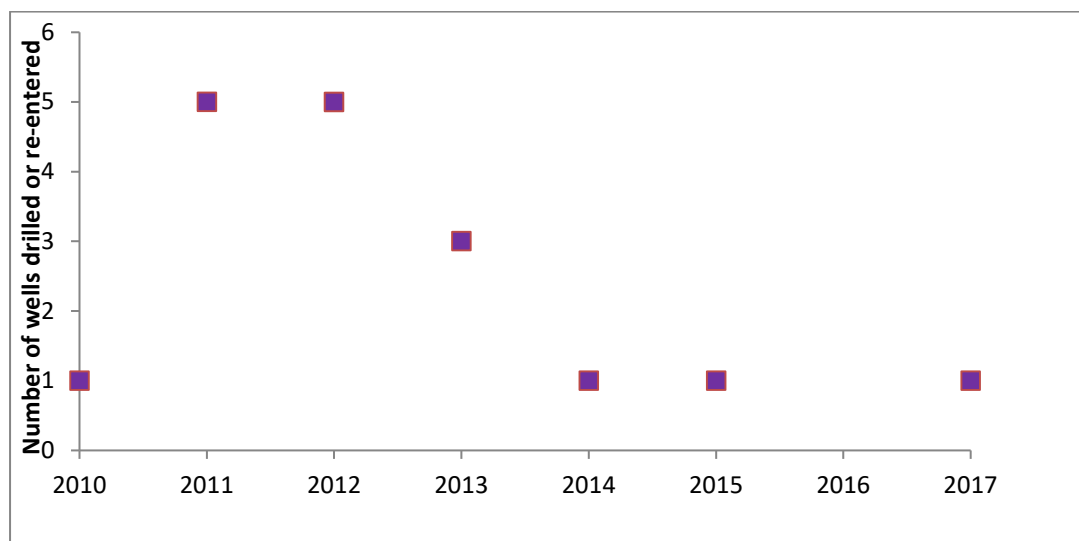


Figure 2.2 – Number of wells drilled or re-entered for completion Offshore Ireland, 2010 – 2017

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 concentration of dispersed oil in produced and displacement water to 30mg l⁻¹. With regard to produced and displacement water discharges, operators are required to ensure that concentrations of dispersed oil do not exceed 30mg l⁻¹ as a monthly average. Samples are taken at least monthly, for discharges 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 $\pm 10\%$.

OSPAR Recommendation 2001/1 also requires that Contracting Parties should ensure that plans to construct new offshore installations, or to modify significantly existing offshore installations, should take the minimisation of discharges as a point of departure.

3.1.1 PRODUCED & DISPLACED WATER

The volume of produced water discharged has declined over the period 2010 to 2017, with a decrease of 47% since 2010, which was attributed to decline in production.

Reinjection of produced water does not take place in Irish waters.

An additional gas production facility came on stream in 2015 however, its PW stream was treated at a waste facility onshore over the period of this report. Discharge of its PW stream to the marine environment did not occur during this reporting period, although the Operator has an EPA IPPC permit to discharge.

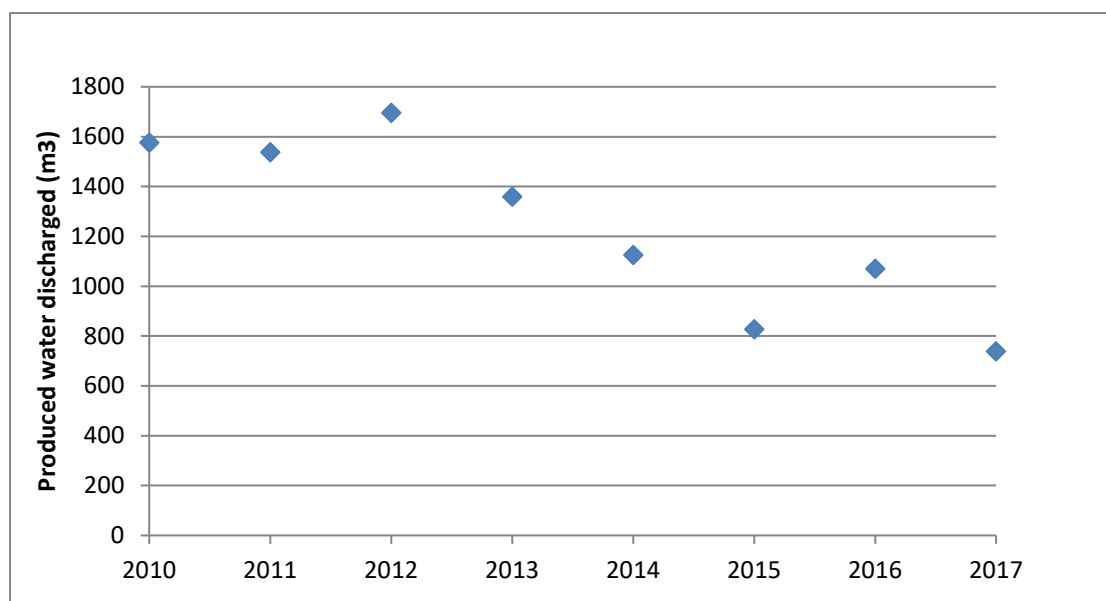


Figure 3.1 – Annual volumes of produced water (m³) discharged, 2010-2017, offshore Ireland

3.1.2 DISPERSED OIL DISCHARGED

The total quantity of dispersed oil discharged annually with produced water remained stable at a maximum of 0.02 tonnes per year over the period 2015-2017. The average concentration of dispersed oil in produced water for the period of 2015-2017 showed a marginal increase on the previous period of 2010 – 2014 (see Figure 3.2). The recent increase to 23 mg l⁻¹ in 2017 has been attributed to the contribution from a pipeline pigging operation in 2017 and high OIW results starting up from a three-week shutdown in September 2017; a common occurrence after starting up while operating levels are established in the system. Although all results have been below the OSPAR Performance Standard of 30 mg l⁻¹, the overall increase due to a single maintenance operation again reflects the relatively large impact that individual procedures can have on a small industry.

The sole contributor to the produced water data is coming close to decommissioning and the composition of the condensate appears to be changing, also bringing higher concentrations of BTEX (dissolved oil).

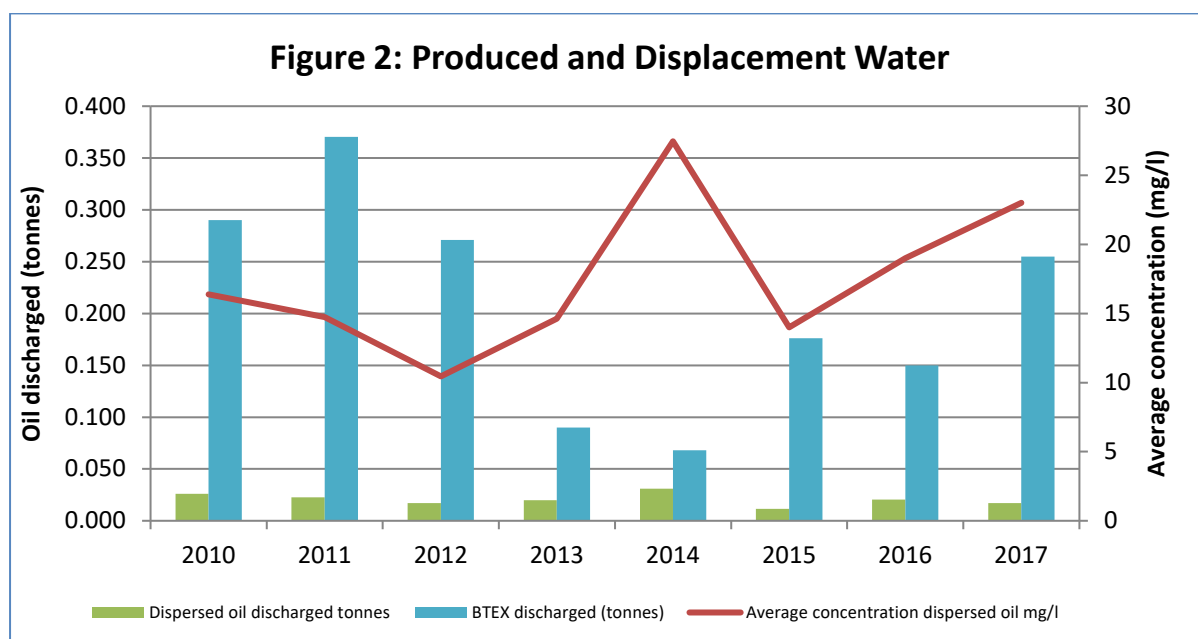


Figure 3.2 – Quantity (in tonnes) and quality of oil discharged offshore Ireland, 2010-2017

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 30mg l⁻¹. The quantity of dispersed oil discharged in Irish waters in excess of the performance standard during the reporting period 2010 to 2017 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 oil⁷ (BTEX) appeared to be decreasing from 2010 – 2014 from 0.3 to 0.1 tonnes, but since then, BTEX concentrations, and subsequently quantity of BTEX discharged have increased. The higher concentrations are 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 the RBA for industry in Irish waters and expects to have made good inroads by year end.

3.3 SPILLS OF OIL TO SEA

⁷ "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.

The number of oil spills to sea during the period 2010 - 2017 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. Although spills, by their nature, are accidental, the frequency and type of spill may be influenced by introducing a culture of environmental awareness and care. In the data, though, there is no apparent trend. The number of spills and quantity spilled also varies greatly across the OSPAR region and so comparison of performance is not possible.

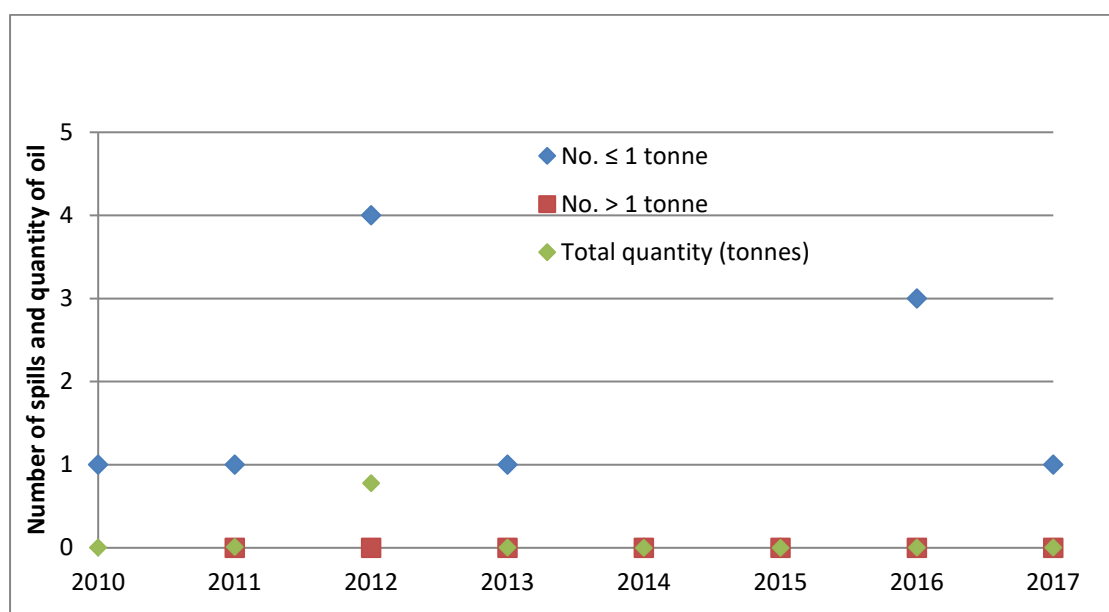


Figure 3.3 – Number of oil spills and quantity of oil spilled (in tonnes) offshore Ireland, 2010-2017

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 cuttings⁸ and prohibits the discharge of cuttings contaminated with OBF⁹ at a concentration greater than 1% by weight on cuttings.

Discharge of OPF-contaminated cuttings is prohibited in Irish waters. 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, 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 are only allowed under permit, with the permit setting out the conditions for use and

⁸ OPF = Organic-phase Drilling Fluids

⁹ OBF = Oil-based fluids

discharge, and the quantities and list of chemicals to be used and discharged. These measures are implemented in Ireland through the Permit for Use and Discharge of Added Chemicals (PUDAC), issued by the Department of Communications, Climate Action and Environment (DCCAE). 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 addition, Ireland has acquired remote access to the CEFAS Offshore Chemicals Database.

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_{50} or EC_{50} less than 1 mg l^{-1} ,
- have biodegradation less than 20%, or
- meets two of three criteria
 - biodegradation less than 60%,
 - BCF larger than 100 or $\text{Log } P_{ow} \geq 3$, or
 - LC_{50}/EC_{50} less than 10 mg l^{-1} .

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 suitable 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 this assessment period.

4.1 CHEMICAL USE & DISCHARGE

Total use and discharge of chemicals between 2010 and 2017 shows no obvious trend. The absence of any trend is largely attributable to the level of drilling and well intervention activity, which can greatly influences total figures.

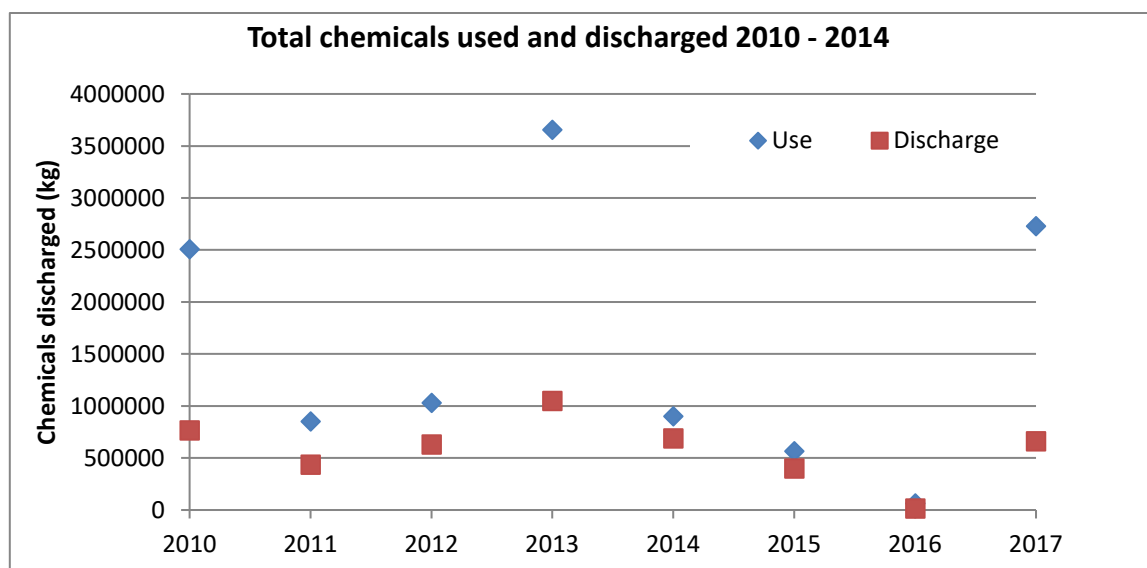


Figure 4.1 – Total chemical use and discharge offshore Ireland 2010-2017 (kg)

4.1.1 CHEMICALS USED

The highest quantity of chemicals used and discharged over the reporting period was in 2013 (Figure 4.1). In that year, the quantity of chemicals used offshore was 3,656 tonnes. Of that quantity, 76% (by weight) of the chemicals were on the PLONOR (Pose Little Or No Risk to the Environment) list and 22% (by weight) were classed as substitution chemicals. The remaining 2% was classed as ranking.

Figures for 2017 (with next highest total use at 2272 tonnes) are that again, 76% (by weight) were PLONOR chemicals while <0.2% (by weight) were 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) indicate again that almost 99% (by weight) were PLONOR chemicals while 0.01 (by weight) were classed as substitution chemicals.

NOTE ON HYDRAULIC OIL DISCHARGE SINCE 2005???

4.1.3 LCPA CHEMICALS AND CANDIDATES FOR SUBSTITUTION

The use of LCPA substances is rare in the reporting period 2010 - 2017, with just 2kg 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 0.5% 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, 2010-2017

Year	Total chemical use	Total chemical discharge	% substitution chemicals used	% substitution chemicals discharged
2010	2507050	765591	1.0	0.003
2011	853150	434725	0.4	0.3
2012	1029099	629518	0.4	0.1
2013	3656277	1049399	22.4	0.1
2014	899873	689296	0.01	0.004
2015	564117	398274	0.07	0.09
2016	63034	13861	0.03	0.00
2017	2727686	660708	0.16	0.42

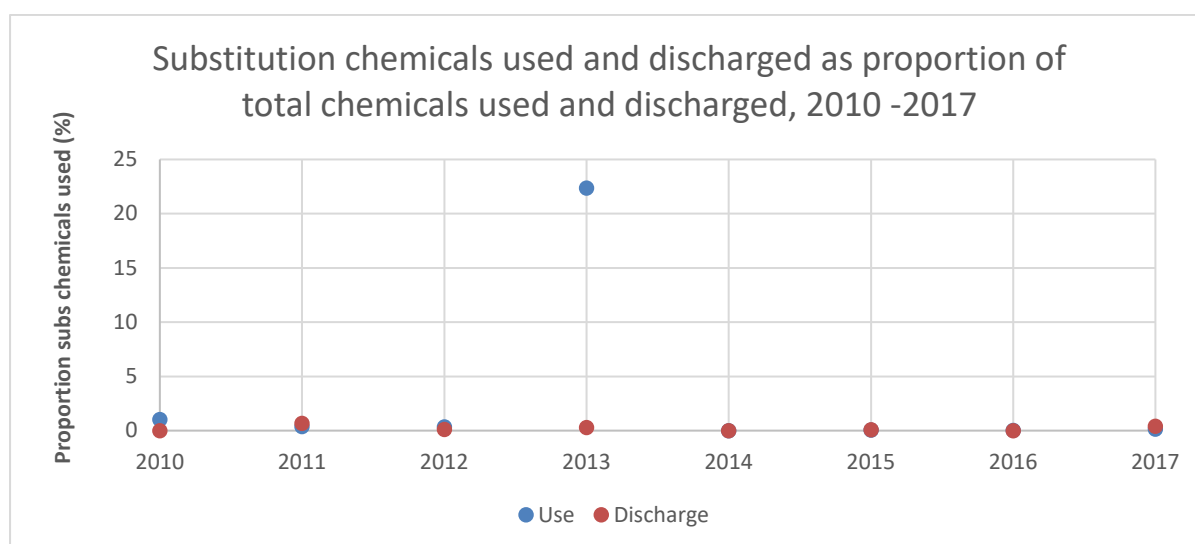


Figure 4.2 –Substitution chemicals as proportion of total chemicals used and discharged (%), 2010 -2017.

4.2 CHEMICAL SPILLS

The number of chemical spills to sea during the period 2010 - 2017 ranged from 0 to 2 per year. The total quantity of chemicals spilled ranged from <20g to 11 tonnes, with two spills greater than 1

tonne in 2017, contributing almost the full total of 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 hydraulic oil from a subsea wellhead. During the period 2010 – 2017 there were no spills of LCPC chemicals.

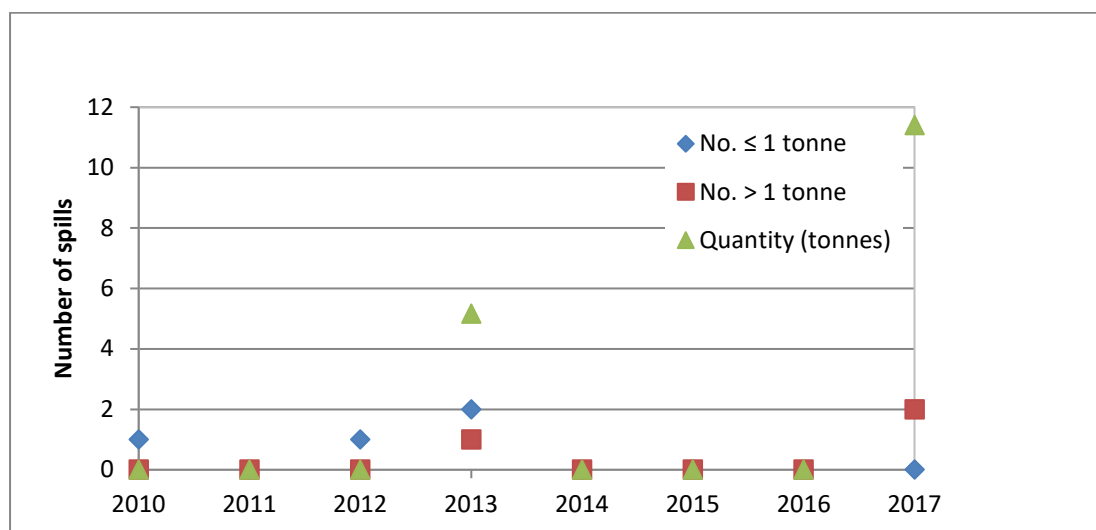


Figure 4.3 – Chemical spills offshore Ireland, 2010-2017

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 CO₂ emissions that are independently verified as required under of the EU ETS Directive.

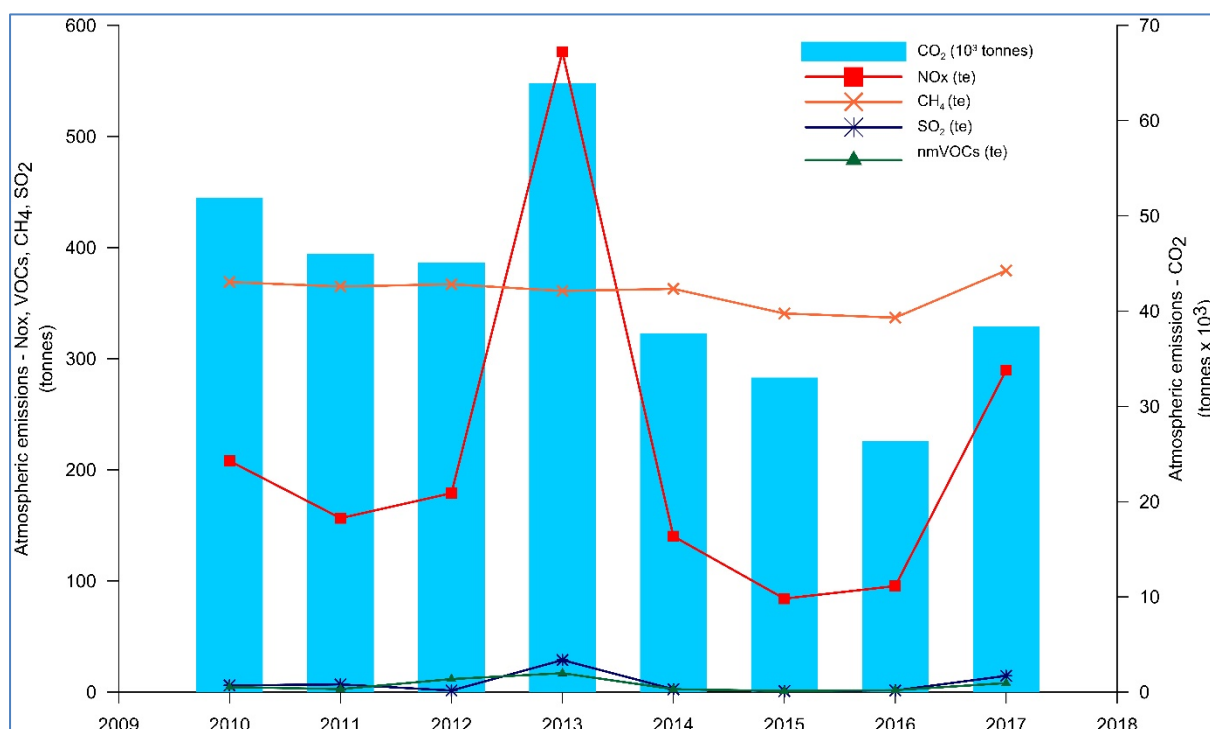


Figure 5.1 – Emissions to atmosphere from offshore oil and gas activities in Irish waters, 2010-2017

The trend for atmospheric emissions has been slightly downward and reasonably stable, with the exception of years with deep sea drilling activity. Increased emissions of NO_x and SO_x are particularly evident in those years as deep-water drilling operations are carried out using dynamic positioning. This again reflects the impacts that are made by individual activities on a small 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 in the traditional manner.

In the case of Kinsale Head, although representing three gas fields and a cluster of wells, the Alpha platform is the primary discharge point as it has a produced water discharge point. The Bravo (unmanned) platform is counted as “other”. Corrib counts as one subsea installation.

For exploration work, all well activities e.g. drilling, intervention and completion, are included under the heading of 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 DCCAE. Reports are examined; any anomalies are investigated and efforts made to remedy.

Analyses for this report were carried out using infra-red techniques up to 2014. From 2015, analysis was by GC-FID OSPAR Reference method.

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, Climate Action and Environment (DCCAE). Operators are required to report to DCCAE 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 regulatory offshore inspection during the course of well operations. The operators' chemical management systems, methods of reporting and other environment aspects of operations are also reviewed during offshore inspections.

For this report, we report the list of candidates for substitution in total, i.e. those substances identified under OSPAR Recommendation 2010/4 on a Harmonised Pre-screening Scheme for Offshore Chemicals including substances with biodegradability <20%, inorganic substances with LC50/EC50 <1mg/l or two out of three of Biodegradation < 60%, LC/EC50 <1mg/l or Log_{pow} >4. We report inorganic chemicals with LC/EC50 >1mg/l within the class of "ranking".

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⁻¹ Emission Standard for Platforms¹⁰;

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.

¹⁰ PARCOM Recommendation of a 40 mg l⁻¹ 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, 2010-2017

Year	2010	2011	2012	2013	2014	2015	2016	2017
Production - Gas	1	1	1	1	1	1	2	2
Drilling /completion works	1	5	5	3	1	0	0	1
Other (storage)	1	1	1	1	1	1	1	1

Table 2: Oily aqueous discharges to the maritime area¹¹

Year	No. of installations	Produced water discharged m ³	Mean concentration dispersed oil mg l ⁻¹	Dispersed oil discharged tonnes	BTEX discharged tonnes
2010	1	1,577	16	0.03	0.29
2011	1	1,538	15	0.02	0.37
2012	1	1,696	10	0.02	0.27
2013	1	1,359	15	0.02	0.09
2014	1	1,126	27	0.03	0.07
2015	1	827	14	0.012	0.18
2016	1	1,070	19	0.020	0.15

¹¹ Measured by IR until 2014

2017	2	739	23	0.017	0.25
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Table 3: Use and discharges of organic-phase drilling fluids (OPF) and cuttings

Year	Total amount of OPF used (tonnes)	Number of wells	Number of wells reinjecting cuttings	Cutting transported to shore (tonnes)	OPF discharged via cuttings (tonnes)
2010	357	1	0	1,728	0
2011	0	0	0	0	0
2012	548	1	0	348	0
2013	2,977	1	0	1,540	0
2014	0	0	0	0	0
2015	0	0	0	0	0
2016	0	0	0	0	0
2017	1,747	1	0	678	0

Table 5: Spillage of oil and chemicals
Table 5a: Number of oil spills, and quantity of oil spilled, 2010-2017

<i>Year</i>	No. of oil spills		Quantity of oil spilled (tonnes)	
	<i>No. ≤ 1 tonne</i>	<i>No. > 1 tonne</i>	<i>Quantity <1 tonnes</i>	<i>Quantity > 1 tonne</i>
2010	1	0	0.001	0
2011	1	0	0.008	0
2012	4	0	0.78	0
2013	1	0	0.001	0
2014	0	0	0.000	0
2015	0	0	0	0
2016	3	0	0.001	0
2017	1	0	0.002	0

Table 5b: Number of chemicals spills, and quantity of oil spilled, 2010-2017

<i>Year</i>	No. of chemicals spills		Quantity of chemicals spilled (tonnes)	
	<i>No. ≤ 1 tonne</i>	<i>No. > 1 tonne</i>	<i>Quantity ≤ 1 tonne</i>	<i>Quantity > 1 tonne</i>
2010	1	0	0.0003	0
2011	0	0	0	0
2012	1	0	0.00001	0
2013	2	1	0.05	5.1
2014	0	0	0	0
2015	0	0	0	0
2016	0	0	0	0
2017	0	2	0	11.4

Table 6: Emissions to air, 2010-2017 (tonnes)

Year	CO ₂	NO _x	nmVOCs	CH ₄	SO ₂
2010	52 x 10 ³	208	4.5	369	6.0
2011	46 x 10 ³	157	2.7	365	6.9
2012	45 x 10 ³	179	12	367	1.4
2013	64 x 10 ³	576	17	361	29
2014	38 x 10 ³	140	2.6	363	2.7
2015	33 x 10 ³	84	1.0	341	0.9
2016	26 x 10 ³	95	1.7	337	1.5
2017	38 x 10 ³	290	8.1	379	14.6

Table 7: The use and discharge of offshore chemicals, 2010-2017

Table 7a: Quantity of offshore chemicals used in kg/year

Pre-screening category	2010	2011	2012	2013	2014	2015	2016	2017
PLONOR	1,904,711	836,840	936,836	2,783,230	878,846	540,229	62,995	1,784,962
List of Chemicals for Priority Action	0	0	0	2	0	0	0	0
Substances flagged for substitution	26,130	3,317	3,708	817,853	113	375	18	4,346
Ranking	576,209	12,993	88,555	55,194	20,915	23,513	21	938,378
Total	2,507,050	853,150	1,029,099	3,656,277	899,873	564,117	63,034	2,727,686

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

Pre-screening category	2010	2011	2012	2013	2014	2015	2016	2017
PLONOR	754,568	423,274	604,132	1,040,237	673,680	376,623	13,839	637,645
List of Chemicals for Priority Action	0	0	0	0	0	0	0	0
Substances flagged for substitution	64	2,917	831	2,956	40	375	0	0
Ranking	10,959	8,534	24,555	6,206	15,577	21,277	22	20,278
Total	765,591	434,725	629,518	1,049,399	689,296	398,274	13,861	660,708

Table 7c: Chemicals spilled in kg per year

Pre-screening category	2010	2011	2012	2013	2014	2015	2016	2017
PLONOR	0	0	0	2,510	0	0	0	849
List of Chemicals for Priority Action	0	0	0	0	0	0	0	0
Substances flagged for substitution	0	0	0	2,220	0	0	0	2,788
Ranking	0	0	0.00001	0	0	0	0	1,110
Total	0	0	0	5,130	0	0	0	4,747

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

2010	408,678
2011	361,130
2012	367,540
2013	336,618
2014	332,647
2015	288,212
2016	2,210,232
2017	2,517,825



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