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North-East Atlantic and its resources*

Assessment of discharges, spills and emissions from offshore oil and gas operations on The Netherlands Continental Shelf, 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 The Netherlands offshore oil and gas operations during the period 2010 – 2014 and provides an assessment of that data. The annual data on which the assessment is based is provided in Appendix 2.

a. Level of Activity

The Netherlands Continental Shelf (NLCS) is a mature oil and gas province within the OSPAR region which saw an 11% reduction in production between 2010 and 2014. The latter figure is 39% lower than the peak recorded in 2004, reflecting the long term trend of declining production.

The number of installations on the NLCS has remained essentially static in recent years, whilst drilling activity has declined since 2011.

b. Discharges & Spills of Oil

The total quantity of dispersed¹ oil (aliphatic oil) discharged to the sea from produced water decreased during the period 2010 – 2014, from 83 tonnes in 2010 to 37 tonnes in 2013, a decrease of 55%. The reduction in the Netherlands compares well with the OSPAR average of a 17% reduction in the amount of dispersed oil discharged to sea, though the Netherlands' average concentration is higher.

Oil spillages during the same period ranged from 0,147 to 1,214 tonnes, with no clear trend apparent.

The majority of installations in the NL sector meet the OSPAR oil-in-water performance standard of no more than 30 mg/l, but occasional failures are seen. The maximum number of such failures was three in 2011, again with no trend apparent. All installations met the performance standard in 2014.

c. Chemicals

The use and discharge of chemicals have been regulated by OSPAR protocols since the start of 2001, and these have been incorporated into Netherlands national legislation since 2003.

Although there was no clear trend in the scale of overall chemical use and discharge over the period studied, significant reductions were seen with respect to hazardous chemicals. The discharge of substitution chemicals decreased from approximately 77 tonnes in 2010 to less than 18 tonnes in 2014. This represents a 77% reduction in the discharge, most of which occurred over the period 2010-2011. Less than 0,1% (by weight) of the chemicals discharged in 2014 contained substances which are candidates for substitution. Environmental goals for the discharges of chemicals that are, or which contain, substances identified as candidates for substitution² were set out in OSPAR Recommendation 2006/3, which targets their phasing out by 2017.

¹ "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.

² Except for those chemicals where, despite considerable efforts, it can be demonstrated that this is not feasible due to technical or safety reasons. Demonstration of those reasons should include a description of the efforts.

OSPAR Recommendation 2005/2 sets environmental goals for the reduction of discharges of substances from OSPAR's List of Chemicals for Priority Action (LCPA), which were to be phased out by 2010. No LCPA substances have been used or discharged in The Netherlands since 2004.

d. Atmospheric Emissions

Atmospheric emissions from offshore oil and gas activities are not regulated by OSPAR measures, but are reported annually by operators. Atmospheric emissions on the NLCS increased significantly between 2010 and 2014 for sulphur dioxide (159%) and carbon dioxide (63%) but no pattern was evident for NO_x, methane or VOCs.

Récapitulatif

Le présent rapport présente les données sur les rejets, les déversements et les émissions pour les opérations pétrolières et gazières offshore sur le plateau continental néerlandais 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

Le plateau continental néerlandais (NLCS) est une province pétrolière de la région OSPAR qui est parvenue au stade de la maturité, et qui a subi une réduction de la production de 11 % entre 2010 et 2014. Ce chiffre représente une réduction de 39% par rapport au pic enregistré en 2004, ce qui reflète la tendance à la baisse de la production sur le long terme.

Le nombre d'installations sur le NLCS est resté pour l'essentiel statique au cours des dernières années, tandis que l'activité de forage a diminué depuis 2011.

Rejets et déversements

La quantité totale d'hydrocarbures dispersés³ (hydrocarbures aliphatiques) rejetée en mer dans l'eau de production a diminué durant la période 2010–2014, de 83 tonnes en 2010 à 37 tonnes en 2013, à savoir une diminution de 55%. La réduction néerlandaise se compare favorablement à la réduction moyenne de 17% d'hydrocarbures dispersés rejetée en mer dans le cadre d'OSPAR. Toutefois la concentration moyenne néerlandaise est plus élevée.

Les déversements d'hydrocarbures pendant cette période vont de 0,147 à 1,214 tonnes ; aucune tendance claire n'est apparente.

La plupart des installations dans le secteur néerlandais satisfont à la norme de performance OSPAR de 30 mg d'hydrocarbures dispersés par litre d'eau de production rejetée en mer; toutefois des échecs occasionnels se produisent. Au maximum, un nombre de trois échecs se sont produits en

³. 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.

2011; de nouveau, aucune tendance n'est évidente. Toutes les installations ont satisfait à la norme de performance en 2014.

Produits chimiques

L'utilisation et le rejet de produits chimiques sont réglementés par des accords OSPAR depuis le début de 2001, ces règlements ont été transposés dans la législation nationale néerlandaise à partir de 2003.

Bien qu'il n'y ait aucune tendance claire en ce qui concerne l'ampleur générale de l'utilisation et du rejet des produits chimiques au cours de la période en question, des réductions significatives ont été décelées en ce qui concerne les produits chimiques dangereux. Le rejet des produits chimiques de substitution a diminué d'environ 77 tonnes en 2010 à moins de 18 tonnes en 2014. Ce qui représente une réduction de 77% produite, pour la plupart, pendant la période de 2010 à 2011. Moins de 0,1 % (par poids) des produits chimiques rejetés en 2014 contiennent des substances qui sont candidates à la substitution. 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 candidates à la substitution⁴. La recommandation prévoit la cessation du rejet de tels produits chimiques d'ici 2017.

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. Aucun produit chimique de la LCPA n'a été utilisé ou rejeté par les Pays-Bas depuis 2004.

Émissions atmosphériques

Les émissions atmosphériques ne sont pas réglementées par des mesures OSPAR, mais elles sont notifiées une fois par an par les opérateurs. Les émissions atmosphériques sur le NLCS ont augmenté de manière significative entre 2010 et 2014 pour ce qui est du dioxyde de soufre (159%) et du dioxyde de carbone (63%), mais aucune tendance n'est évidente pour le NOx, le méthane ou les COV.

⁴ 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. Introduction

This report provides an assessment of the discharges, spills and emissions to the environment from offshore oil and gas operations in The Netherlands 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 Netherlands sector, with the aim of demonstrating the effectiveness of OSPAR measures in the NLCS. Trends have been assessed using expert judgement and not by statistical analyses.

This assessment is based on data submitted by operators on the NLCS to The Netherlands authorities, and reported by The Netherlands 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.

Where relevant, the performance on the NLCS has been compared to the overall performance in the OSPAR area, using the following sources:

“OSPAR report on discharges, spills and emissions from the offshore oil and gas activity in 2013” (OSPAR Commission 2015)

“Assessment of the OSPAR report on discharges, spills and emissions from the offshore oil and gas activity 2010-2012” (OSPAR Commission 2014)

“Draft OSPAR report on discharges, spills and emissions from the offshore oil and gas activity in 2014” (EAP Meeting 2016).

The operators have used procedures for sampling and analysis detailed by OSPAR Agreement 2005-15. Accredited or accepted laboratories have been used.

Details of Netherlands QA/QC procedures are discussed in section 7 of this report.

2. Setting the Scene

2.1 Level of Activity

The Netherlands is currently the third largest producer of oil and gas in the OSPAR Region, but, current production levels (Figure 1) are 39% down on the peak achieved in 2004, when a total of nearly 24 000 000 toeq was recorded, and a long term decline is anticipated. Between 2010 and 2014 a fall of 11% was seen, which compares favourably with a 29% reduction for the OSPAR region during the same period. However, whilst the number of wells drilled on the NLCS has fallen steadily since 2011, this contrasts with an increase that is evident for the OSPAR region as a whole.

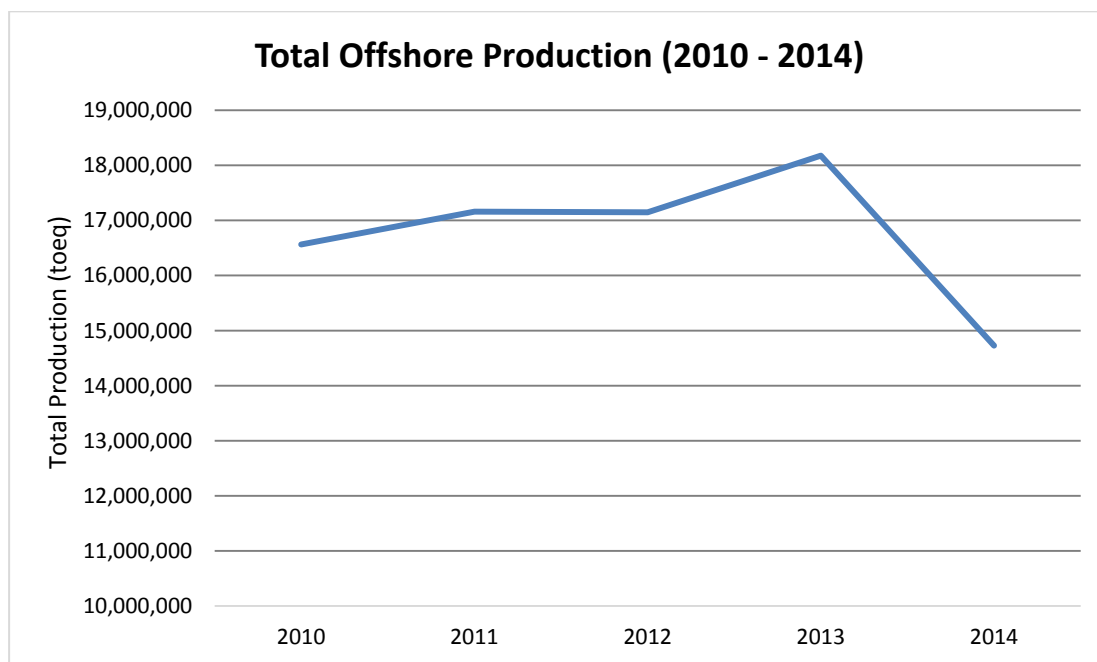


Figure 1: Total offshore oil & gas production in the NLCS, 2010-2014

The number of installations with emissions and discharges in The Netherlands sector of the OSPAR Maritime Area remained essentially static during the period 2010 – 2014, if drilling installations are excluded (Figure 2). However, it is noted that changes in counting practices in the Netherlands mean that the subsea installations reported in the years up to 2011 are now classified as gas installations.

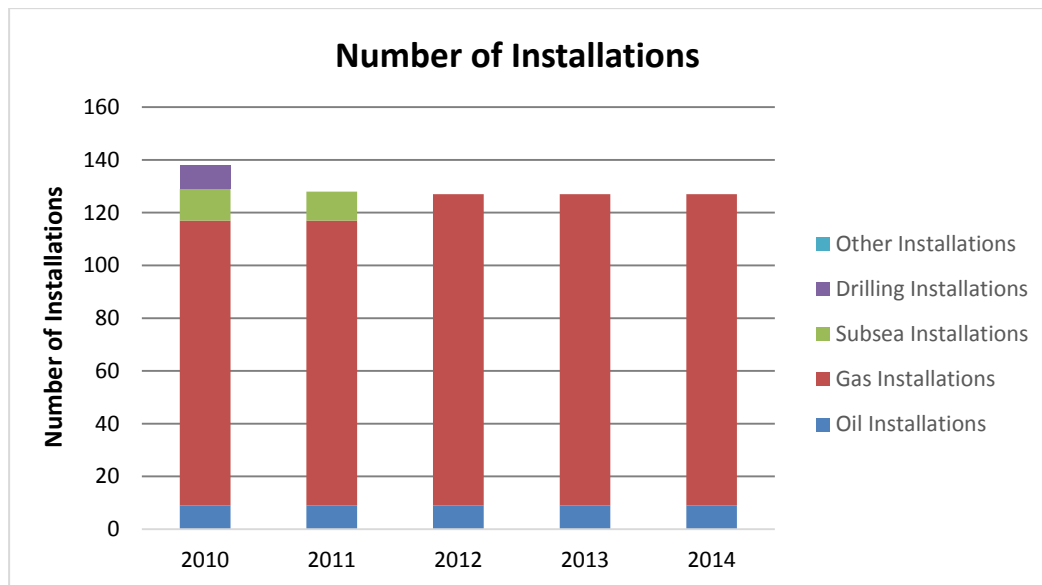


Figure 2: Number of Installations on the NLCS, 2010-2014

Drilling installations have been excluded from mention since there was a change in the manner in which OSPAR recorded and reported drilling activity during the study period. Up to the year 2010 ‘drilling years’ were determined on the basis of time spent drilling, rather than the number of wells drilled, e.g. a Mobile Offshore Drilling Unit (MODU) was counted as active for every quarter of a year spent undertaking drilling activity, irrespective of the number of wells drilled. To better reflect drilling activity, since 2011 the number of wells drilled in each calendar year is reported. The number of geological side tracks is also included in the report. Wells drilled data had not been reported to OSPAR previously, but data held by SSM confirms that 31 wells were drilled in 2011 and 27 wells were drilled in 2012. Over the 2011 - 2014 period reported to OSPAR, the number of wells drilled fell from 31 in 2011 to 20 in 2014.

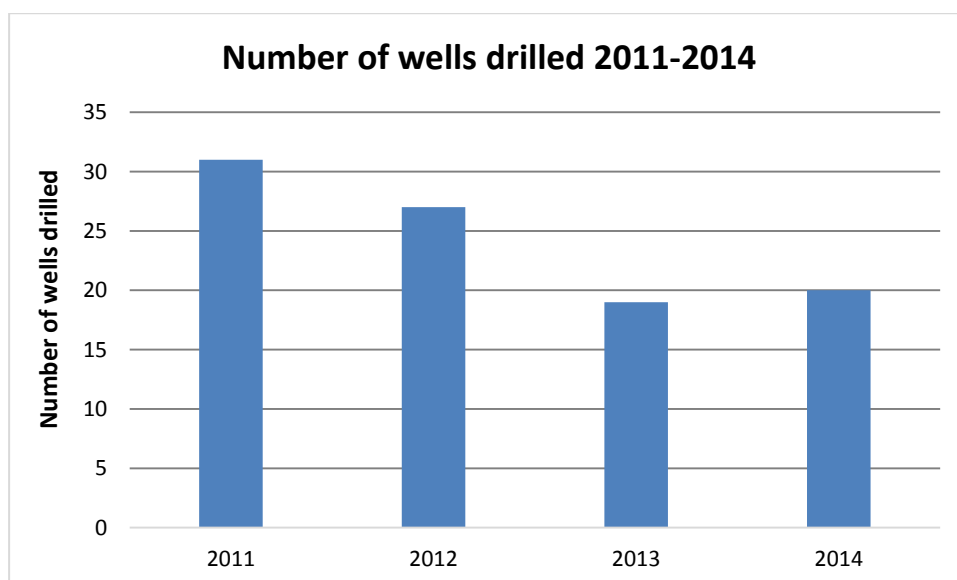


Figure 3: Number of wells drilled on NLCS, 2010-2014

3. 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). The NL implemented this administratively by requiring all licence operators in the NL to have an EMS in place prior to undertaking any offshore oil and gas operations. Operators could either have a certified EMS (ISO14001 or EMAS) or an EMS that was in accordance with the principles of such a standard, and was independently verified on a two yearly basis by a certification body accredited by the RvA (the national accreditation body for The Netherlands). Since 2005 all operators have had an EMS which meets the NL requirements. Of the 11 licence operators in the Netherlands currently undertaking offshore oil & gas operations, 6 are certified to ISO14001 while the remaining 5 have an EMS which has been verified to conform to the principles of ISO14001.

Every operator with an EMS must also publish a public statement to cover any offshore oil and gas operations undertaken in the previous year.

4. Oil Discharges

4.1 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 mg/l. The Netherlands implements this Recommendation into law through the Mining Act, Mining Decree and the Mining Regulations of 2003 (as amended). Article 40 of the Mining Act requires that offshore operations are conducted under a permit. Article 80.1 of the Decree forbids the discharge of oil and oil-containing mixtures, whilst the detailed requirements are stipulated under Article 9.1 of the Regulations. With regard to produced and displacement water discharges, operators are required to ensure that concentrations of dispersed oil do not exceed 30 mg/l as a monthly average, but up to 100 mg/l is allowed during the four hours following start-up operations. Samples are taken for analysis on every other day for installations discharging more than 2 tonnes of dispersed oil per year, or samples are taken at least weekly for installations discharging 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 and displacement water discharged from each installation. To facilitate this calculation, the flow rates of the relevant discharges must be determined with an uncertainty of not more than $\pm 5\%$.

OSPAR Recommendation 2001/1 (as amended) 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 and, where appropriate, consider produced water reinjection (PWRI).

The Netherlands had addressed this requirement through an Environmental Covenant agreed between the Netherlands Government and the offshore industry. Following the expiry of the Covenant at the end of 2010, the requirement to apply or review BAT and BEP for all installations has been temporarily suspended. However, the re-instatement of this requirement is under consideration as part of the current review of The Mining Regulations.

4.1.1 Produced & displacement water

Produced water discharges fell from nearly 9 million cubic metres in 2010 to less than one third of that amount in 2014 (Figure 4).

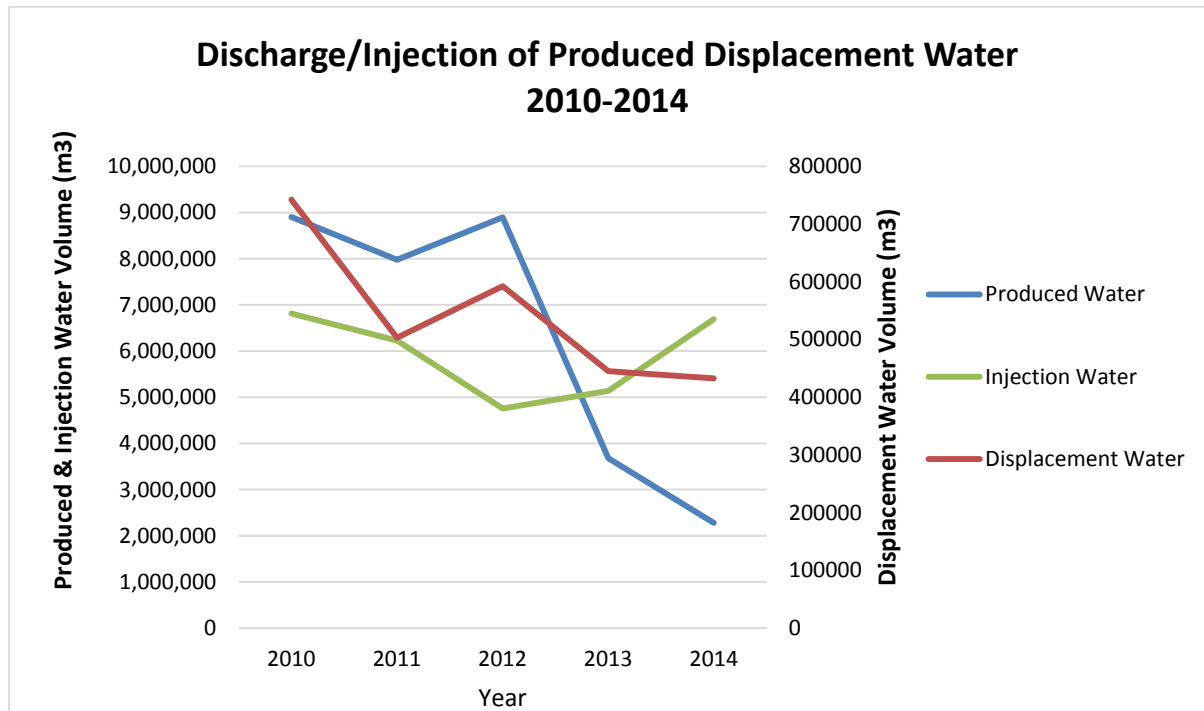


Figure 4: Discharge / Injection of produced and displacement water, 2010-2014

Comparing this with OSPAR overall figures for the period 2010-2014, shows that:

- The produced water discharges in The Netherlands and in the OSPAR area reduced between 2010 and 2014 by 74% and 10 %, respectively. The reductions in the OSPAR area are associated with increased amounts of water injected and reduced water production. In The Netherlands, a reduction in the total quantity of produced water was also seen, but the amount of water injected actually decreased during the period.
- The discharges of displacement water reduced in the OSPAR region by 1%, whilst a 42% reduction was seen in The Netherlands.

4.1.2 Dispersed oil discharged

The total quantity of dispersed oil discharged with produced and displacement water decreased from 83 tonnes in 2010 to 37 tonnes in 2014, a reduction of 55%. However, the pattern is inconsistent, and somewhat offset by an increase in Dispersed Oil Concentration from 9 mg/l to 16 mg/l during the same period, as shown in Figure 5. The reduction in the Netherlands compares well with the OSPAR

average of a 17% reduction in the amount of dispersed oil discharged to sea, though the Netherlands' average concentration is higher than the OSPAR average which decreased slightly from 13,14 mg/l in 2010 to 12,2 mg/l in 2014.

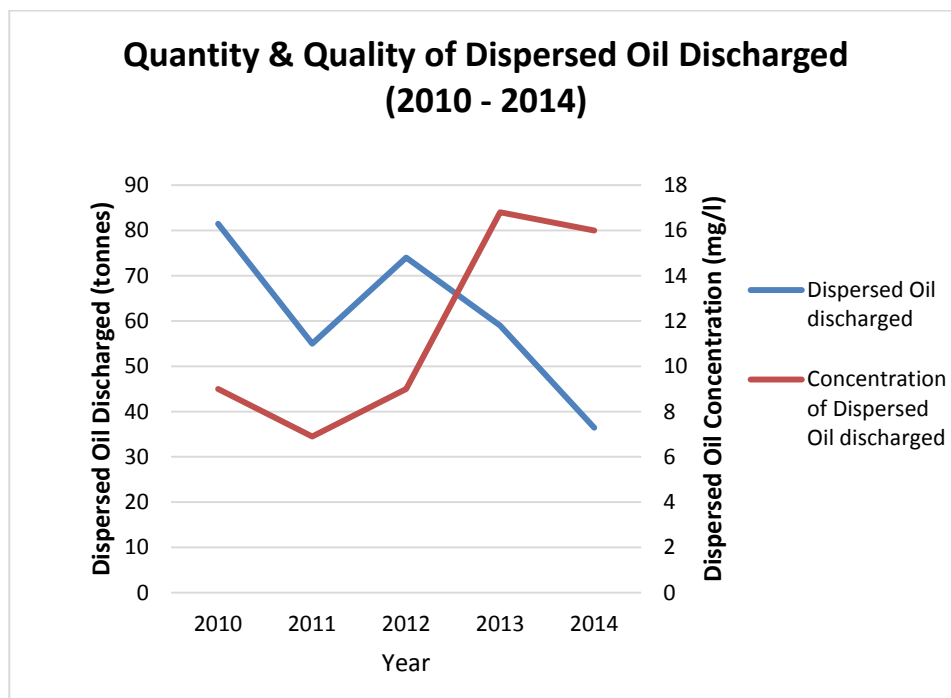


Figure 5: Quantity and quality of dispersed oil discharged on NLCS, 2010-2014.

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. While the majority of installations in the NL sector meet the performance standard, a small number of installations occasionally fail to do so, as shown in Figure 6. The number of installations which failed to meet the standard varied from zero in 2010 and 2014 to three in 2011, with no clear trend apparent.

There is likewise no trend evident in the quantity of dispersed oil discharged by installations that failed to meet the performance standard during the period 2010 – 2013.

For regulatory purposes in the NL this [*i.e.* dispersed oil concentration] is calculated as a monthly flow weighted average of all samples, or monthly result where only a single sample is taken. However, for reporting to OSPAR the NL calculates an annual average.

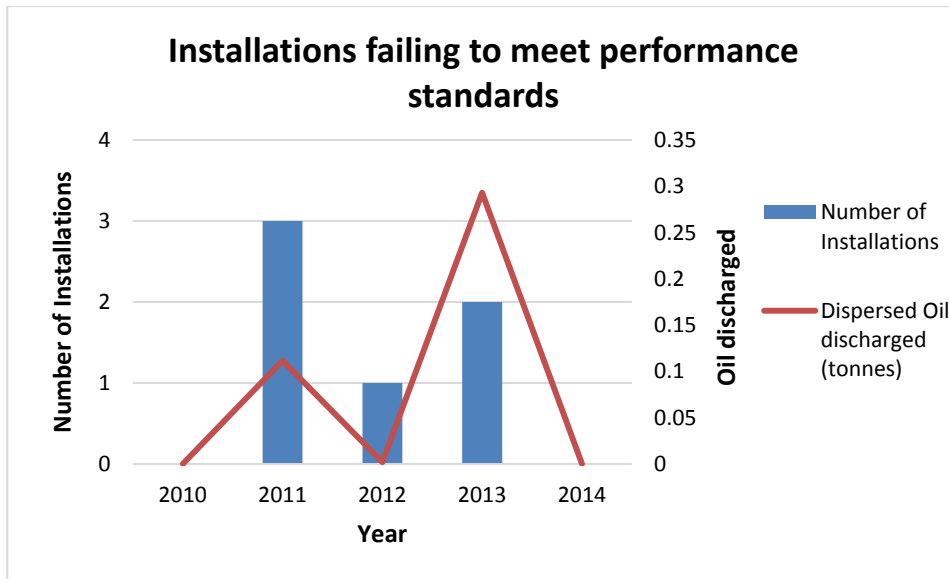


Figure 6: Installations failing to meet the Recommendation 2001/1 Performance Standard, 2010 – 2014

The Netherlands also reports the dissolved oil content (as represented by BTEX components) in produced water and displacement water discharges as required under the NL Mining Regulations. OSPAR does not regulate these discharges as the components rapidly biodegrade in seawater once discharged. The discharge of dissolved oil⁵ (BTEX) has fallen steadily during the period 2010-2014 from 75,59 tonnes in 2010 to 49 in 2014. By comparison, in the OSPAR region as a whole, dissolved oil discharge increased from 4 228 tonnes in 2010 to 4 485 tonnes in 2014

4.2 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. The NL has prepared guidance for industry and adopted a phased implementation plan to allow the assessments to be evenly spread over the 2015 - 2018 period. The NL will use a whole effluent toxicity approach for the RBA assessments, with additional measures required only if the WET risk assessment indicates an unacceptable risk. If this should occur, Substance-based Risk Assessment will be necessary, and will identify the source of the risk and direct appropriate risk reduction measures. For the first cycle of assessments, Substance-based Risk Assessment is a requirement, to enable the authorities to compile a dossier for each platform.

The NL competent authorities will decide on the assessment programme in collaboration with the operators, such that approximately one third of the platforms are assessed each year. Priority will be given to platforms in sensitive areas (e.g. Natura 2000 sites) with those of lower perceived risk following.

⁵ "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.

4.3 Spills of Oil to Sea

The number of oil spills to sea during the period 2010 - 2014 has varied year on year from as low as 10 spills in 2013 up to 34 spills in 2010 (Figure 7). The quantity spilled has also varied from as low as 0,147 tonnes in 2010 up to 1,214 tonnes in 2011. Although the number of spills has declined since 2010, there is no distinct pattern, and likewise no trend in the total quantity of oil spilled is evident. Similarly, the number of spills and quantity spilled shows considerable variation across the OSPAR region and any comparison of these data cannot be regarded as meaningful.

The amount of oil spilled on the NLCS was between 0 and 2% (wt) of the amount of dispersed oil discharged with produced water in the same period.

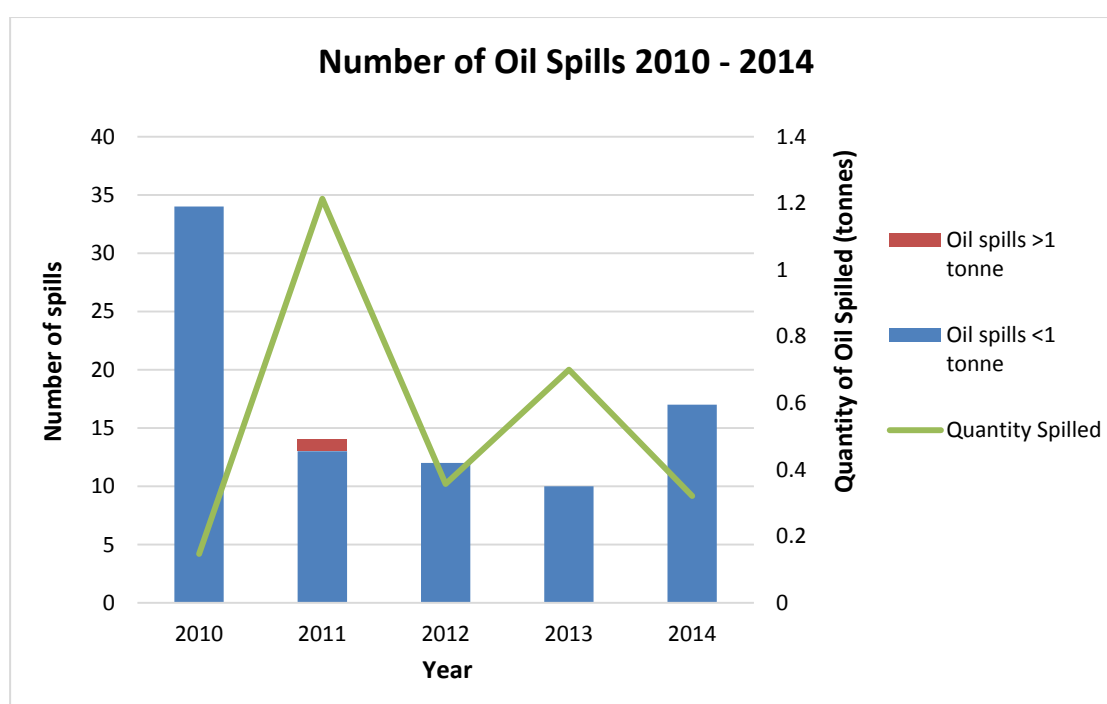


Figure 7: Number of oil spills and quantity of oil spilled in NLCS, 2010-2014

4.4 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 cuttings⁶ and prohibits the discharge of cuttings contaminated with OBF⁷ at a concentration greater than 1% by weight on cuttings. The Netherlands implements this Decision under Articles 9.1 and 9.2 of The Mining Regulations 2003 (as amended), which control the use and discharge of oil-containing mixtures and chemicals respectively.

As a result, no discharge of organic phase fluids was recorded for the period assessed.

⁶ OPF = Organic-phase Drilling Fluids

⁷ OBF = Oil-based fluids

5. Chemicals

The use and discharge of offshore chemicals have been covered since 2001 by a number of OSPAR measures as listed in Appendix 1. In the Netherlands, these requirements are written into Article 9 of The Mining Regulations 2003, which include the requirement that chemicals should be registered through submission of HOCNF forms.

Registration is managed on behalf of the Netherlands authorities by the Centre for Environment, Fisheries & Aquaculture Science (CEFAS), which also undertakes a similar function for the UK. The procedure is documented under a protocol that is accessible via the Cefas web site (<https://www.cefas.co.uk/publications-data/offshore-chemical-notification-scheme/>). Following registration, chemical products are ordered by function and ranked according to Hazard Quotient (HQ), calculated using the Chemical Hazard and Risk Management (CHARM) model. Products for which CHARM is not applicable are ranked by the separate OCNS system.

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

- on the OSPAR LCPA;
- inorganic with LC₅₀ or EC₅₀ less than 1 mg/l;
- have biodegradation less than 20%; or
- meets two of three criteria:
 - biodegradation less than 60%;
 - BCF larger than 100 or Log P_{ow} ≥ 3; or
 - LC₅₀/EC₅₀ less than 10 mg/L.

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 identified alternative.

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. The Netherlands has implemented this recommendation in full.

5.1 Chemical Use & Discharge

Total usage of chemicals between 2010 and 2014 has varied considerably, but without any clear trend being apparent. The largest and smallest tonnages were recorded in adjacent years (2012 and 2013 respectively) with the 2010 and 2014 figures showing little overall change over the assessment period. The overall figures for discharges follow a similar pattern (Figure 8).

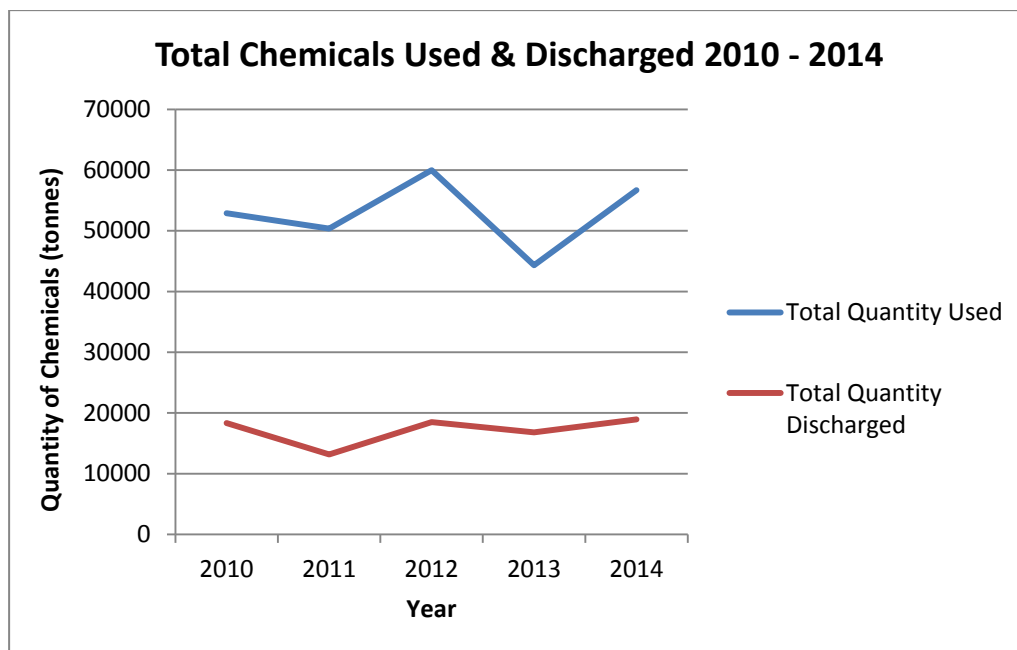


Figure 8: Total chemical use and discharge on NLCS 2010-2014

5.1.1 Chemicals used

The total quantity of chemicals used in the Dutch sector in 2014 was 56 704 tonnes. 75% (by weight) of the chemicals were on the PLONOR list and another 23% (by weight) contained no substances which are candidates for substitution. None of the chemicals used contained substances listed on the List of Chemicals for Priority Action (LCPA). Comparable OSPAR average figures for 2014 are that 65% (by weight) of chemicals used were PLONOR listed and a further 34% (by weight) did not contain substances that are candidates for substitution.

5.1.2 Chemicals discharged

The total quantity of chemicals discharged to the sea in 2014 was 18 947 tonnes, 96% (by weight) being included on the PLONOR list and another 3,5% (by weight) being chemicals that do not contain candidates for substitution. Less than 0,1% (by weight) of the discharged chemicals contained substances which are candidates for substitution. Comparable OSPAR average figures for 2014 are that 72% (by weight) of chemicals discharged were PLONOR and a further 28% (by weight) did not contain substitution chemicals.

5.1.3 LCPA chemicals and candidates for substitution

The usage of all LCPA substances in The Netherlands had ceased by 2004. By comparison, the majority of Contracting Parties have followed suit although the UK permits the use of certain applications of lead in pipe dopes. Discharge is however forbidden.

The discharge of substitution chemicals decreased from approximately 77 tonnes in 2010 to less than 18 tonnes in 2014, a 77% reduction in the discharge (Figure 9). By comparison, discharges in the OSPAR region as a whole fell from 1 452 tonnes in 2010 to 1 067 tonnes in 2014, a 41% reduction.

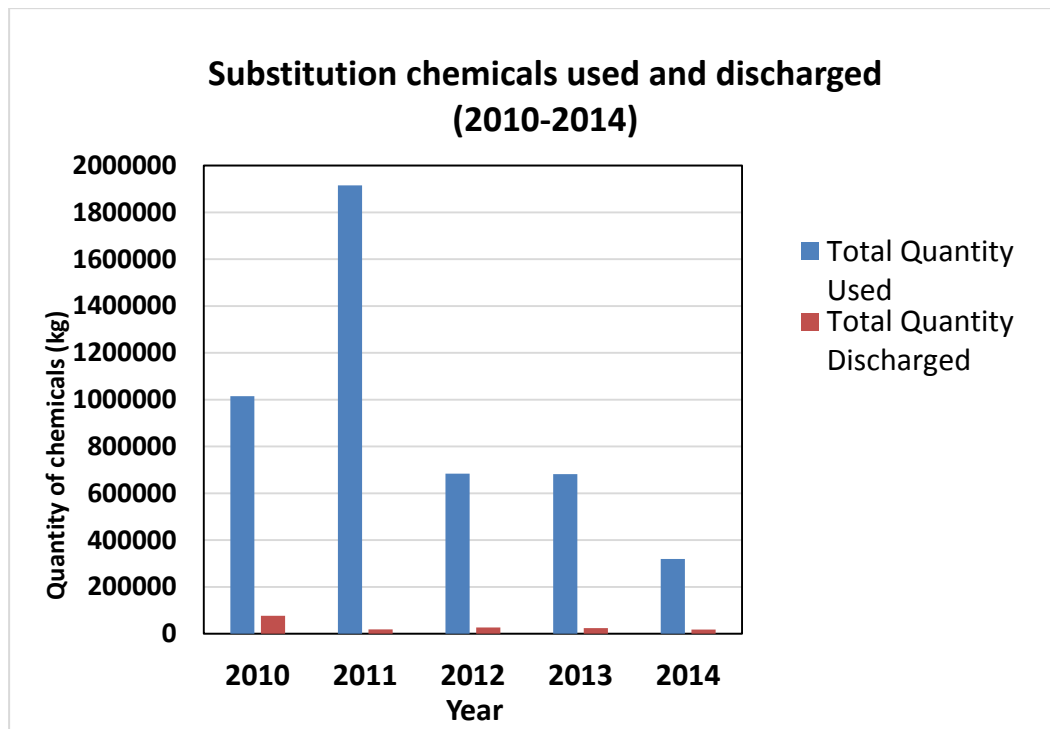


Figure 9: Use and discharge of chemicals which are candidates for substitution 2010-2014

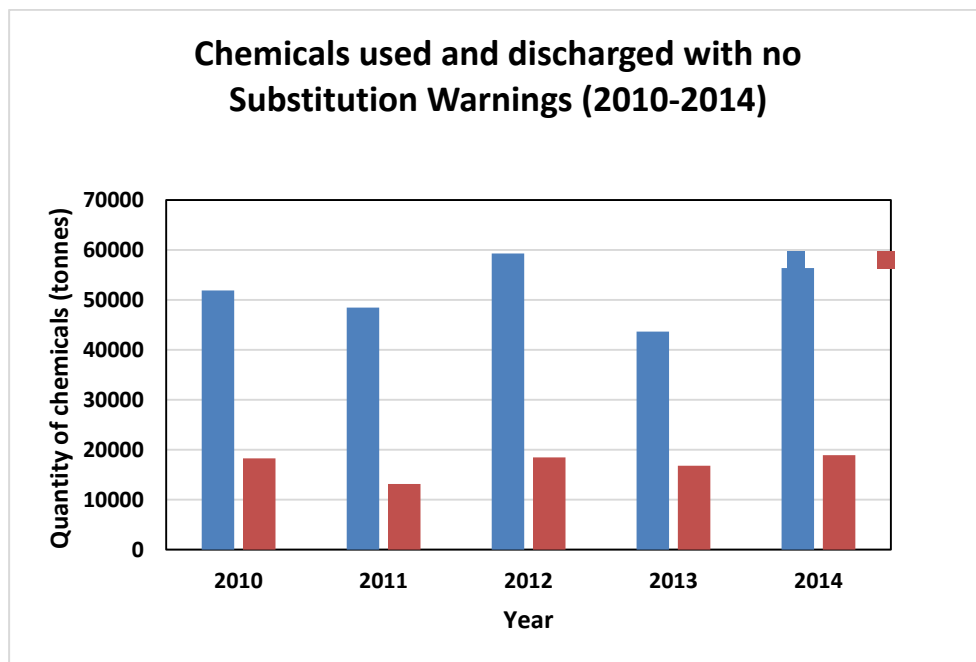


Figure 10: Use and discharge of chemicals with no Substitution Warnings, 2010-2014

5.2 Chemical Spills

The number of chemical spills to sea during the period 2010 - 2014 ranged from 1 to 9, whilst the total quantity spilled ranged from 3 kg up to 28 tonnes (Figure 11). These figures include any water that is used in the chemical formulations. There are no clear trends in the frequency or quantity of spills, either in the Netherlands or across the OSPAR region.

Excluding any water that is used in the chemical formulations, the substances spilled can be broken down into those on the PLONOR list (72%) or which did not contain candidates for substitution (27,6%), with substitutable chemicals comprising the remaining 0,4%.

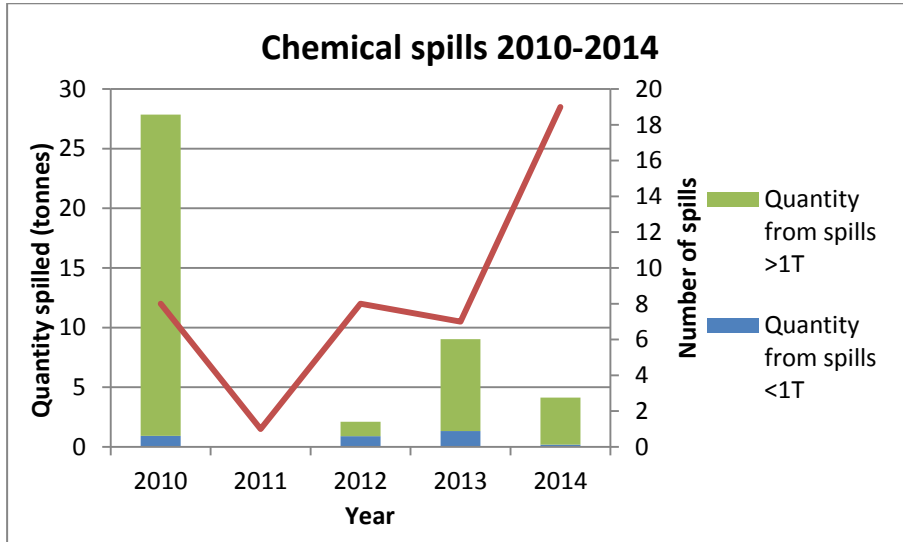


Figure 11: Chemical spills on NLCS 2010-2014.

6. 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 that have been transposed into NL legislation. 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.

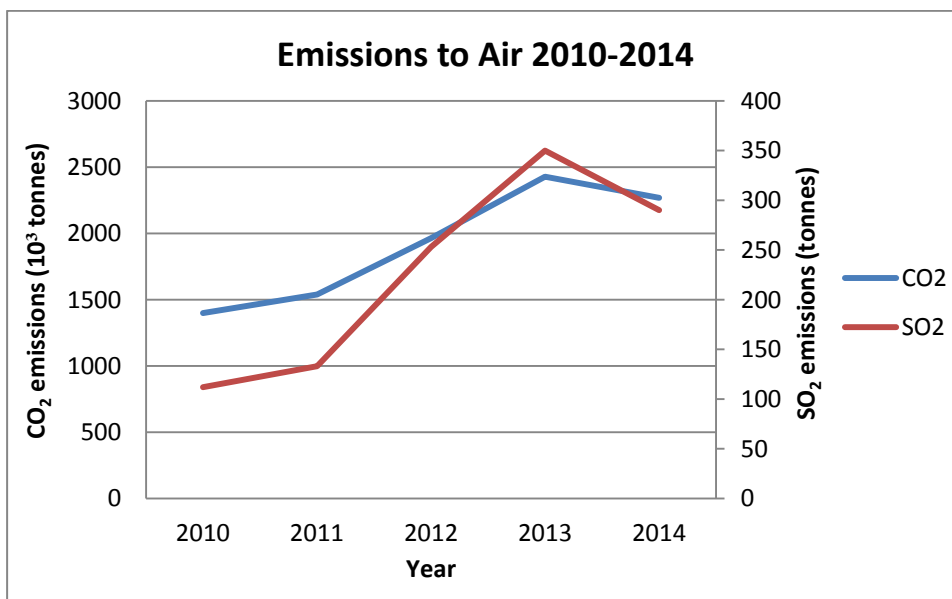


Figure. 12: Emissions to air on NLCS (CO₂ & SO₂), 2010-2014

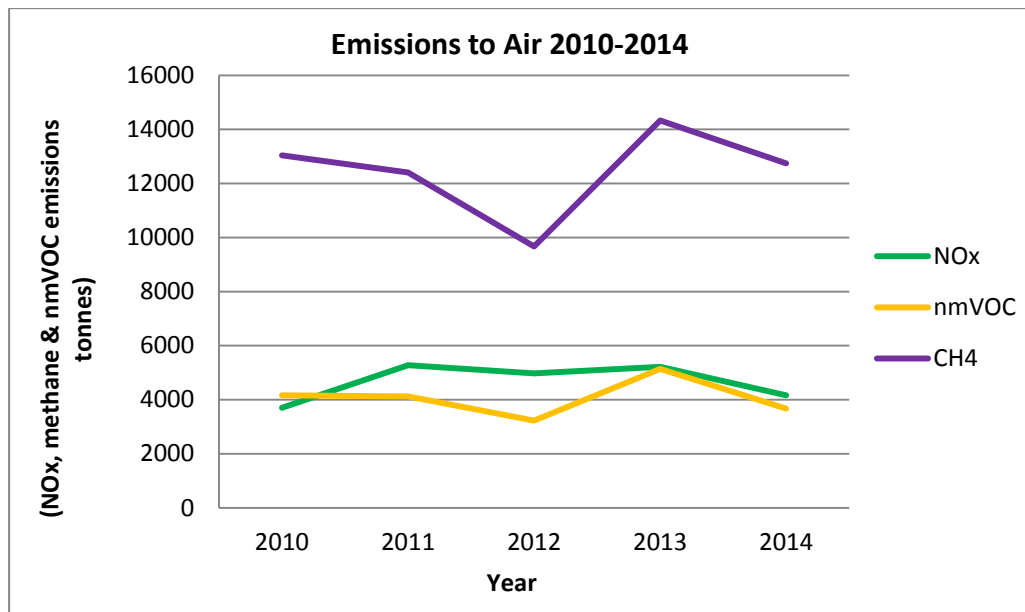


Figure 13: Emissions to air on NLCS (NO_x, nmVOC, CH₄), 2010-2014

Atmospheric emissions showed increases between 2010 and 2014 for sulphur dioxide (159%) and carbon dioxide (63%) whilst no clear trends are apparent in the emissions of NO_x, methane and VOCs. By comparison, emissions of all five gases across the OSPAR Region were relatively stable, with figures ranging from a 7% reduction in methane to a 19% increase in VOCs, the latter figure nonetheless below that recorded for 2009.

7. Summary of Counting & QA Procedures in The Netherlands relating to OSPAR Data

7.1 Counting of Installations

The Netherlands counts installations as follows:

All installations are counted, irrespective of whether there is a local discharge, on the basis that surface installations will always have emissions to air and drainage discharges to sea, and there could also be unscheduled discharges such as oil or chemical spills from all surface and subsea installations. Installations which are connected by walkways or bridges are also each counted separately. For subsea installations, rather than reporting one installation per well or cluster of well heads, the NL considers that all the subsea wells or well clusters serving a single field should be reported as one installation.

7.2 Reporting of Dispersed Oil

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

Quantification of the discharge is required to meet a +/-5% uncertainty measurement, using a flow meter that is situated downstream of the last oil/water separator at a location where the flow is as homogeneous as possible.

The concentration of dispersed oil is determined by sampling the discharge stream on a routine basis and analysing the samples. Operators are required to sample discharge streams a minimum of every other day for discharges of greater than 2 tonnes dispersed oil per year, which is comparable to the minimum of 16 samples per month required by OSPAR Recommendation 2001/01 for discharges on this scale. For installations with discharges of less than 2 tonnes dispersed oil per year, the Netherlands requirement for (representative) weekly sampling goes beyond the requirements of the OSPAR Recommendation, which stipulates only that the samples should be representative.

Although spot sampling provides an indication of discharge quality, it is recognised that there can be significant variation in water quality over short periods of time and that there is a great deal of uncertainty associated with the sampling regime. Operators of installations with large discharges, and operators of new installations, are therefore encouraged to use online analysers for process monitoring to provide a real time indication of produced water quality so that any deterioration in quality can be responded to more quickly.

While operators are required to report analysis results in accordance with the OSPAR Reference method the majority of NL installations continue to undertake onsite analysis using infra-red techniques and the results are then converted to an OSPAR Reference Method result using correlation graphs, which are updated at least every 6 months.

Dispersed oil discharges are reported every month to SSM and reports are regularly checked, including at the end of each year, to identify any anomalies. The audit trail of results from offshore analysis to reporting to SSM is also checked during offshore inspections.

7.3 Reporting of Chemical Use & Discharge

Operators in the NL 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 the permit. Operators are required to report the use and discharge to the NL regulator upon completion of specific activities or on a quarterly basis.

Chemical use and discharge is reported to SSM and the NL regulator can run reports to compare permitted use and discharge against reported use and discharge to check for any significant variations, breaches or obvious transcription errors. The operators' chemical management systems and methods of reporting are also reviewed during offshore inspections.

7.4 Reporting of Atmospheric Emissions

Operators are required to report atmospheric emissions by an electronic reporting format on an annual basis. For larger installations, the determination of CO₂ emissions is undertaken in accordance with the installation's monitoring and reporting plan submitted under The European Greenhouse Gas Emissions Trading Scheme Regulations 2012, which sets requirements for measurement uncertainty of +/-2,5 for combustion equipment fuel sources and +/-5% for flare fuel sources. 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. For diesel consumption this 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 to SSM are reviewed to identify any unusual results and reports can also be run to cover a number of years to review trends

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

Discharges contaminated with oil

PARCOM Recommendation 86/1 of a 40 mg/l Emission Standard for Platforms⁸;

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.

⁸ PARCOM Recommendation of a 40 mg/l 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 1a: Number of installations in The Netherlands maritime area with discharges to the sea, or emissions to the air 2010-2014

2010	2011	2012	2013	2014
138	128	127	127	127

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

	2010	2011	2012	2013	2014
Oil	9	9	9	9	9
Gas	108	108	118	118	118
Subsea	12	11	0	0	0
Drilling	9	-	-	-	-
Other	0	0	0	0	0
Total	138	128	127	127	127

Wells drilled	-	31	27	19	20
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Table 2: Oily aqueous discharges to the maritime area***Table 2a: Oil discharged in displacement and produced water (in tonnes), 2010-2014**

2010 (GC-FID)	2011 (GC-FID)	2012 (GC-FID)	2013 (GC-FID)	2014 (GC-FID)
Dispersed	Dispersed	Dispersed	Dispersed	Dispersed
83	56	75	60	37

Dispersed Oil Concentration (mg/l)

2010 (GC-FID)	2011 (GC-FID)	2012 (GC-FID)	2013 (GC-FID)	2014 (GC-FID)
9	6,9	9,0	16,8	16

Table 2b: Dissolved oil discharged in displacement and produced water (in tonnes), 2010-2014

2010	2011	2012	2013	2014
Dissolved	BTEX	BTEX	BTEX	BTEX
75,59	67,7	64,4	54,5	49

Table 2c: Quantity of displacement and produced water discharged daily to the sea (in m³/day), 2010-2014

2010	2011	2012	2013	2014
26 429	23 232	26 000	11 298	7 425

Table 2d: Total volume of produced water and displacement water discharged, and produced water injected (in m³/year), 2010-2014

	2010	2011	2012	2013	2014
PW*	8 904 568	7 976 520	8 897 631	3 678 521	2 277 430
DPW**	742 097	503 090	592 448	445 321	432 759
IPW***	6 812 074	6 225 959	4 755 369	5 138 137	6 690 997
Total	16 458 739	14 705 569	14 245 448	9 261 979	9 401 186

* Produced water

** Displacement water

*** Injected produced and displacement water

Table 3: Installations which do not meet OSPAR performance standard for dispersed oil in aqueous discharges

Table 3a: Number of installations with discharges exceeding the 30 mg oil/l performance standard, valid from 2007 onwards, and quantity of oil discharged by these installations (in tonnes)

	2010	2011	2012	2013	2014
Number of installations exceeding 30 mg/l	0	3	1	2	0
Quantity of dispersed oil discharged	0	0,1	0,0	0,3	0

Table 4: Use and discharges of organic-phase drilling fluids (OPF) and cuttings

Table 4a: Quantities of oil and other organic-phase fluids discharged via cuttings (in tonnes), 2010-2014

2010	2011	2012	2013	2014
Total OPF	Total OPF	Total OPF	Total OPF	Total OPF
0	0	0	0	0

Table 4b: Number of wells drilled with OPF, with discharge of contaminated cuttings to the maritime area, 2010-2014

2010		2011		2012		2013		2014	
OBF	non-OBF OPF	OBF	non-OBF OPF	OBF	Other OPF	OBF	Other OPF	OBF	Other OPF
0	0	0	0	0	0	0	0	0	0

Table 5: Spillage of oil and chemicals**Table 5a: Number of oil spills, 2010-2014 - Spills less than 1 tonne (≤ 1 T) and spills above 1 tonne (> 1 T)**

2010		2011		2012		2013		2014	
≤ 1 T	> 1 T	≤ 1 T	> 1 T	≤ 1 T	> 1 T	≤ 1 T	> 1 T	≤ 1 T	> 1 T
34	0	13	1	12	0	10	0	17	0

Table 5b: Total quantity of oil spilled, in tonnes, 2010-2014

2010		2011		2012		2013		2014	
≤ 1 T	> 1 T	≤ 1 T	> 1 T	≤ 1 T	> 1 T	≤ 1 T	> 1 T	≤ 1 T	> 1 T
0,147	0	0,143	1,071	0,4	0	0,681	0	0,321	0

Table 5c: Number of spills of chemicals and amount of chemical spills in tonnes/year, 2010-2014

	2010	2011	2012	2013	2014
Number of spills of chemicals	8	1	8	7	19
Tonnage of spilled chemicals	28	0,003	2,1	9,0	4,136

Table 6: Emissions to air, 2010-2014

CO₂ (in millions of tonnes)

2010	2011	2012	2013	2014
1,39	1,54	1,96	2,43	2,27

NO_x (in thousands of tonnes)

2010	2011	2012	2013	2014
3,70	5,27	4,97	5,22	4,17

nmVOCs (in thousands of tonnes)

2010	2011	2012	2013	2014
4,16	4,12	3,23	5,14	3,67

CH₄ (in thousands of tonnes)

2010	2011	2012	2013	2014
13,04	12,41	9,67	14,33	12,74

SO₂ (in tonnes)

2010	2011	2012	2013	2014
112	133	253	350	290

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

Prescreening category	2010	2011	2012	2013	2014
List of Chemicals for Priority Action	0	0	0	0	0
Inorganic LC50 or EC50 < 1 mg/l*	0	0	0	0	0
Biodegradation < 20%*	244 482	349 002	231 545	150 205	203 370
Substance meets two of three criteria*	770 136	1 566 448	452 277	531 900	116 197
PLONOR	41 713 369	36 110 148	46 550 994	34 616 138	42 614 129
Inorganic, LC50 or EC50 > 1 mg/l	277 442	784 501	459 251	309 021	950 654
Ranking Substances	9 901 488	11 563 870	12 289 133	8 731 380	12 819 428
Total	52 906 917	50 373 969	59 983 200	44 338 644	56 703 779

* Chemicals for substitution

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

Prescreening category	2010	2011	2012	2013	2014
List of Chemicals for Priority Action	0	0	0	0	0
Inorganic LC50 or EC50 < 1 mg/l*	0	0	0	0	0
Biodegradation < 20%*	19 179	4 542	3 627	913	1 094
Substance meets two of three criteria*	57 636	13 976	22 960	23 195	16 642
PLONOR	17 462 642	12 281 563	17 441 780	16 144 242	18 269 435
Inorganic, LC50 or EC50 > 1 mg/l	112 448	41 875	79 976	50 794	81 835
Ranking Substances	694 870	819 255	955 649	595 553	578 461
Total	18 346 775	13 161 210	18 503 992	16 814 696	18 947 466

* Chemicals for substitution

Table 7c: Chemicals spilled in kg per year

Prescreening category	2010	2011	2012	2013	2014
List of Chemicals for Priority Action	0	0	0	0	0
Inorganic LC ₅₀ or EC ₅₀ < 1 mg/l*	0	0	0	0	0
Biodegradation < 20%*	0	0	0	0	6
Substance meets two of three criteria*	-	0	0	0	0
PLONOR	0	0	360	256	1 153
Inorganic, LC ₅₀ or EC ₅₀ > 1 mg/l	53	0	0	0	11
Ranking	357	0	0	224	431
Total	410	0	360	480	1 600

* Chemicals for substitution.

Table 8: The Netherlands total production in oil equivalents, (toeq)

2010	2011	2012	2013	2014
16 562 387	17 160 297	17 147 270	18 176 106	14 725 986



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