OSPAR COMMISSION

Assessment of discharges, spills and emissions from offshore oil and gas operations on the Dutch Continental Shelf 2018 - 2023

Offshore Oil & Gas Industry Series

2025

Assessment of discharges, spills and emissions from offshore oil and gas operations on the Dutch Continental Shelf, 2018-2023

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.

Executive Summary

This report presents the discharge, spill and emission data for The Netherlands offshore oil and gas operations during the period 2018 – 2023 and provides an assessment of that data. The annual data on which the assessment is based are provided in Annex 2.

Level of Activity

The Netherlands Continental Shelf (NLCS) is a mature oil and gas province within the OSPAR Maritime Area which saw approximately a 44% reduction in production between 2018 and 2023. The number of installations with discharges or emissions on the NLCS has decreased from 100 in 2018 to 83 in 2023; drilling activity decreased from 13 wells drilled in 2018 to only 4 wells drilled in 2023.

Discharges and Spills of Oil

The total quantity of dispersed oil discharged with produced and displacement water on the NLCS decreased by 16%. Dispersed oil discharges for the OSPAR Maritime Area decreased by 21% from 2018 to 2023. In 2023, the dispersed oil discharged by The Netherlands' industry contributed approximately 1,5% to the total volume discharged in the whole OSPAR Maritime Area.

The number of oil spills to sea during the period 2018 - 2023 has varied, with a low of 3 spills in 2020 and 2022 and a high of 11 spills in 2021. The quantity spilled varied from an annual total of 0,01 tonnes to 0,9 tonnes. No oil spills over 1 tonnes occurred.

The majority of installations on the NLCS meet the OSPAR oil-in-water performance standard of maximum 30mg/l. From 2018 to 2023, only in 2020 did one installation fail to meet the performance standard, discharging 0,78 tonnes of dispersed oil during the period where the performance standard was exceeded.

Chemicals

The use of chemicals decreased by 39% over the assessment period, where discharge of chemicals was reduced by 66%. In 2023, 90,1% (by weight) of the chemicals discharged were on the PLONOR list, 9,0% (by weight) of those discharged were Ranking chemicals and 0,9% (by weight) of the chemicals discharged were candidates for substitution. No chemicals with substances from OSPAR's List of Chemicals for Priority Action (LCPA) were discharged.

Atmospheric Emissions

Atmospheric emissions from offshore oil and gas activities are not regulated by OSPAR measures, but are reported annually by operators. Atmospheric emissions decreased over the reporting period, with a 25% reduction for CO_2, 34% reduction for SO_2, 55% reduction for CH_4, 57% reduction for NO_x and a 41% reduction for nmVOCs.

Récapitulatif

Le présent rapport comporte des données portant sur les rejets, déversements et émissions provenant des activités pétrolières et gazières offshore des Pays-Bas entre 2018 et 2023 ainsi que leur évaluation. Les données annuelles sur lesquelles se fonde l'évaluation se trouvent à l'Annexe 2.

Niveau d'activité

Le plateau continental néerlandais (NLCS) est une région pétrolière et gazière arrivée à maturité de la zone maritime OSPAR ; la production a diminué de 44 % entre 2018 et 2023. Le nombre d'installations avec rejets ou émissions répertoriées dans le NLCS est passé de 100 en 2018 à 83 en 2023 ; l'activité de forage a diminué, passant de 13 puits forés en 2018 à seulement 4 puits forés en 2023.

Rejets et déversements d'hydrocarbures

La quantité totale d'hydrocarbures dispersés rejetés avec l'eau de production et de déplacement dans le NLCS a diminué de 16 %. Les rejets d'hydrocarbures dispersés dans la zone maritime OSPAR ont diminué de 21 % entre 2018 et 2023. En 2023, les hydrocarbures dispersés rejetés par l'industrie néerlandaise ont représenté environ 1,5 % du volume total rejeté dans l'ensemble de la zone maritime OSPAR.

Le nombre de déversements d'hydrocarbures en mer au cours de la période 2018-2023 a varié, avec un minimum de 3 déversements en 2020 et 2022 et un maximum de 11 déversements en 2021. La quantité déversée a varié entre 0,01 tonne et 0,9 tonne par an. Aucun déversement supérieur à 1 tonne n'a été enregistré.

La majorité des installations dans le NLCS répondent aux normes de performance d'OSPAR en ce qui concerne les teneurs en hydrocarbures dans l'eau, à savoir inférieures à 30 mg/l. De 2018 à 2023, seule une installation n'a pas respecté la norme de performance en 2020, rejetant 0,78 tonne d'hydrocarbures dispersés pendant la période où la norme de performance a été dépassée.

Produits chimiques

L'utilisation de produits chimiques a diminué de 39 % au cours de la période d'évaluation, et les rejets de produits chimiques ont été réduits de 66 %. En 2023, 90,1 % (en poids) des produits chimiques rejetés figuraient sur la liste PLONOR, 9,0 % (en poids) étaient des produits chimiques classés et 0,9 % (en poids) étaient des produits chimiques candidats à la substitution. Aucun produit chimique contenant des substances figurant sur la liste OSPAR des produits chimiques devant faire l'objet de mesures prioritaires (LCPA) n'a été rejeté.

Emissions atmosphériques

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. Les émissions atmosphériques ont diminué au cours de la période de notification, à savoir : une réduction de 25 % pour le CO_2, de 34 % pour le SO_2, de 55 % pour le CH_4, de 57 % pour le NOx, et de 41 % pour les nmVOCs.

1. Introduction

This report provides an assessment of the discharges, spills and emissions to the environment from offshore oil and gas operations on The Netherlands Continental Shelf (NLCS) for the period 2018 – 2023. The purpose of this report is to assess trends in discharges and emissions with the aim of evaluating the effectiveness of OSPAR measures and national regulations. Trends have been assessed using expert judgement and not by statistical analyses. This report does not attempt to assess the impact on the environment of the reported discharges, spills and emissions.

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 is included in Annex 2. Where relevant, the performance on the NLCS has been compared to the overall performance in the OSPAR area, using the following source:

- "OSPAR Offshore Discharges Report 2023 data Part B" (EAP meeting 2025).

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

The Netherlands is currently the third largest producer of oil and gas in the OSPAR Maritime Area; however, just over 2% of total production of oil and gas in the OSPAR Maritime Area was produced on the NLCS in 2023. Between 2018 and 2023, a decrease of 44% in total production was seen. By contrast, the offshore production in the whole OSPAR Maritime Area during the same period only decreased by approximately 11%, see Figure 1.

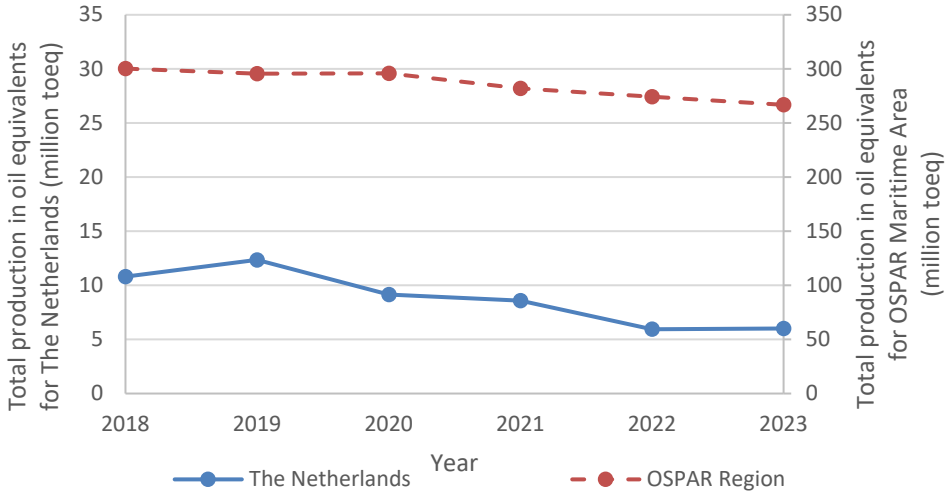

Figure 1: Total offshore oil and gas production (in million tonnes oil equivalent) on the NLCS and for the whole OSPAR Maritime Area, 2018-2023.

The number of installations with emissions and discharges in The Netherlands sector of the OSPAR Maritime Area (excluding drilling installations) is slowly decreasing between 2018 and 2023, from 100 installations with emissions to 83 (Figure 2). An increase in number of installations is seen between 2020 and 2021, which is

most likely caused by a number of installations not being operational in 2020 due to the Covid-19 pandemic. In general, a downward trend in installations can be observed. Decommissioning activities have increased and will continue to increase, so further decreases in number of installations are expected.

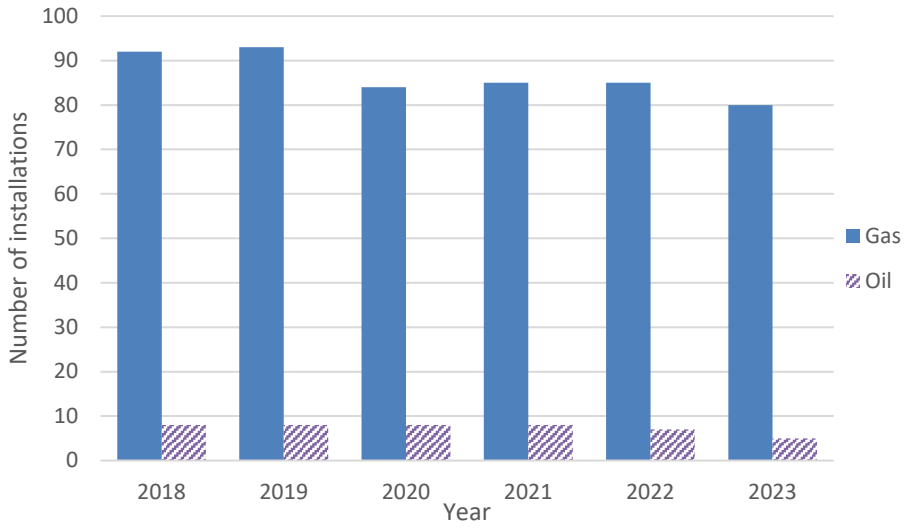

Figure 2: Number of installations on the NLCS, 2018-2023.

A similar decrease in drilling activities can be observed when evaluating the number of wells drilled. In general, a downward trend is visible, with an incidental lower value in 2020 due to decreased offshore activities most likely caused by Covid-19 (see Figure 3).

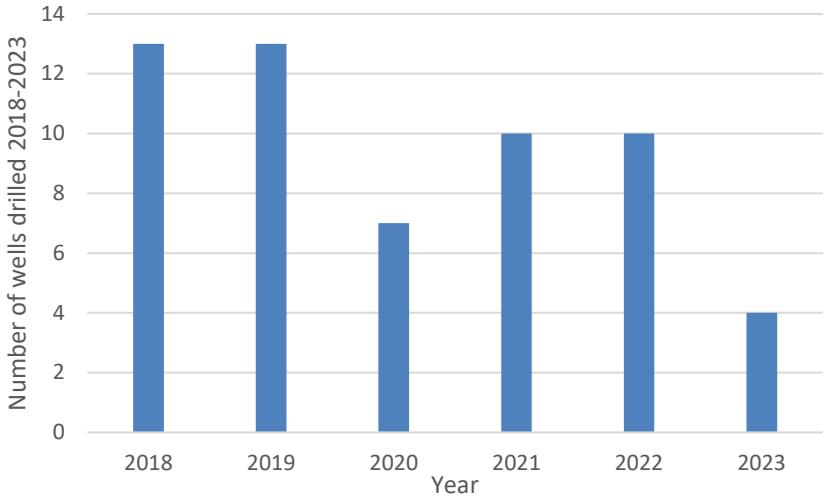

Figure 3: Number of wells drilled on the NLCS, 2018-2023.

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 (EMS) that is in accordance with the principles of an internationally recognised standard (ISO14001 or EMAS). The Netherlands implemented this administratively by requiring all licenced 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. Currently, all operators have an EMS in place in accordance with the Netherlands requirements.

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 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 Mining Decree forbids the discharge of oil and oil-containing mixtures, whilst the detailed requirements are stipulated under Article 9.1 of the Mining 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. Up to 100 mg/l is allowed during the four hours following start-up operations. On manned installations, samples are taken for analysis on every other day for installations discharging more than 2 tonnes of dispersed oil per year, whilst samples are taken weekly for installations discharging less than 2 tonnes of dispersed oil per year. For unmanned installations, samples are taken at least every three months. In addition to this requirement, samples are also taken during visits which last more than eight hours. When visits take more than five days, the same schedule for sampling which applies for manned installations has to be followed.

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 ±5%. OSPAR Recommendation 2001/1 (as amended) also requires that Contracting Parties should ensure that plans to construct new offshore installations, or plans 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).

4.1.1 Produced & displacement water

Produced water discharges in The Netherlands show, in general, a decreasing trend. Again, a sudden decrease in 2020 can be seen most likely caused by a decrease in offshore activities caused by Covid-19. Discharges of displacement water show a relatively constant trend during the assessment period. A decrease of approximately 41% in discharges of produced water and displacement water combined is reported in the period from 2018 to 2023 (see Figure 4), which compares to a 20% decrease of produced and displacement water discharges for the whole OSPAR Maritime Area over the same period. In 2023, The Netherlands contributed 1,2% of produced and displacement water discharged to the OSPAR Maritime Area. As the Netherlands is mainly a gas producing country, discharges of produced water are generally low.

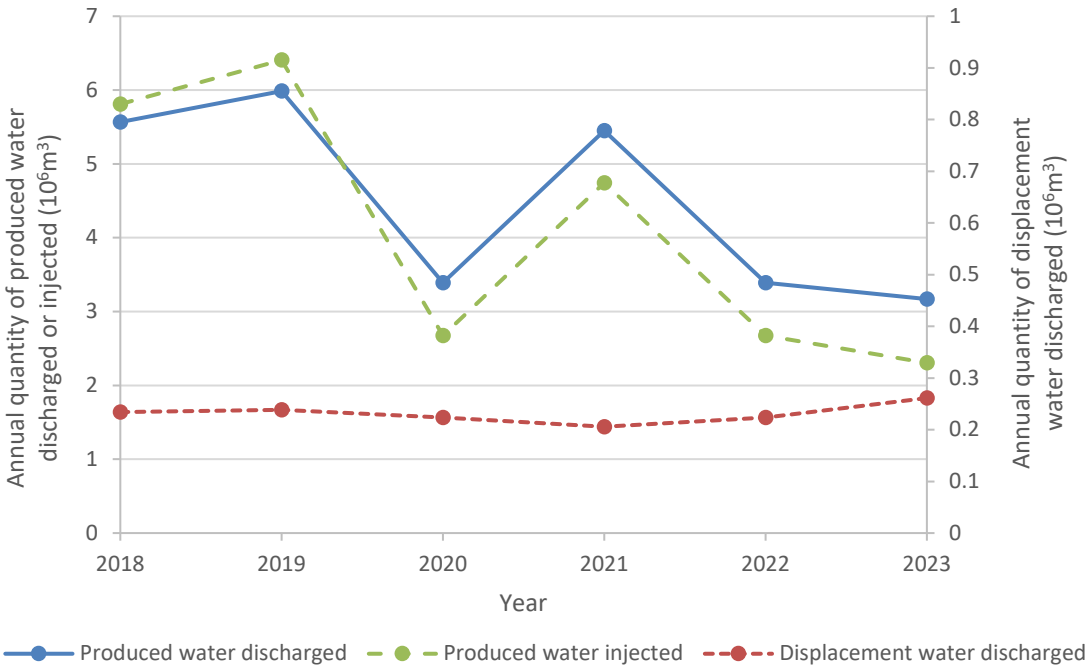

Figure 4: Discharge and injection of produced water and displacement water, 2018-2023.

The total quantity of produced water injected decreased by approximately 60% on the NLCS over the period 2018-2023, where it followed largely the same trend as discharge of produced water, see Figure 4. For the whole OSPAR Maritime Area, injection of produced water increased with approximately 28%.

4.1.2 Dispersed oil discharged

The total quantity of dispersed oil discharged with produced and displacement water on the NLCS decreased by 16%, which occurred mainly from 2020 to 2022 (see Figure 5). In 2023, a sudden increase was observed. This is due to a fault in the separation process of one oil production installation, resulting in larger discharges of dispersed oil. As the Netherlands has very few oil production installations and the discharge of dispersed oil comes mainly from these installations, the trend for the NLCS was noticeably affected by the increased value from this one installation. The problem was fixed in December of 2023, when measures were taken. The monthly discharges of dispersed oil were above 30 mg/l (being approximately 46 mg/l) for this installation. However, as the period over which this occurred was limited, the annual average of dispersed oil discharges for this installation did not exceed 30 mg/l. Overall, dispersed oil discharges for the OSPAR Maritime Area decreased by 21% from 2018 to 2023. In 2023, the Netherlands discharge approximately 1,5% of the dispersed oil discharged for the whole OSPAR Maritime Area.

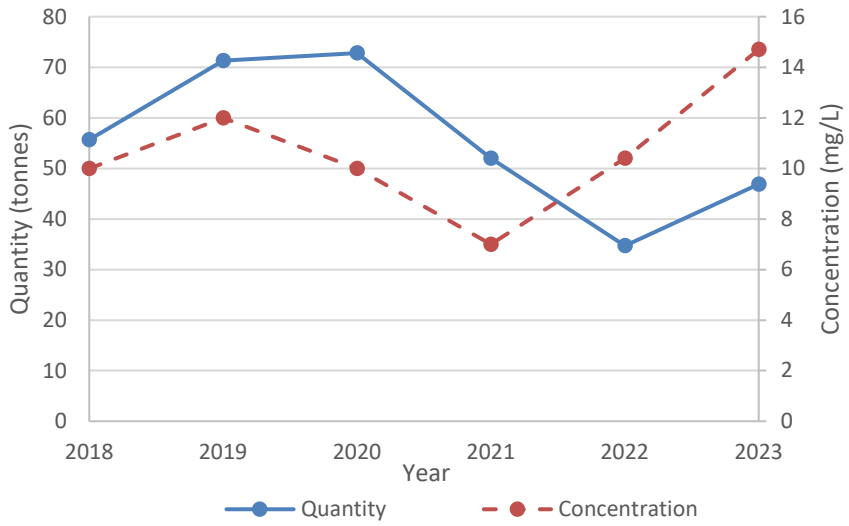

Figure 5: Quantity of dispersed oil in produced water discharges, and concentration of dispersed oil in produced water discharges on NLCS, 2018-2023.

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. Over the assessment period did one installation fail to meet the performance standard, discharging 0,78 tonnes of dispersed oil during the period where the performance standard was exceeded. This occurred in 2020. For regulatory purposes, in the Netherlands the dispersed oil concentration is calculated as a monthly flow weighted average of all samples, or monthly result when only a single sample is taken. For reporting purposes to OSPAR, the Netherlands calculates an annual average.

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.

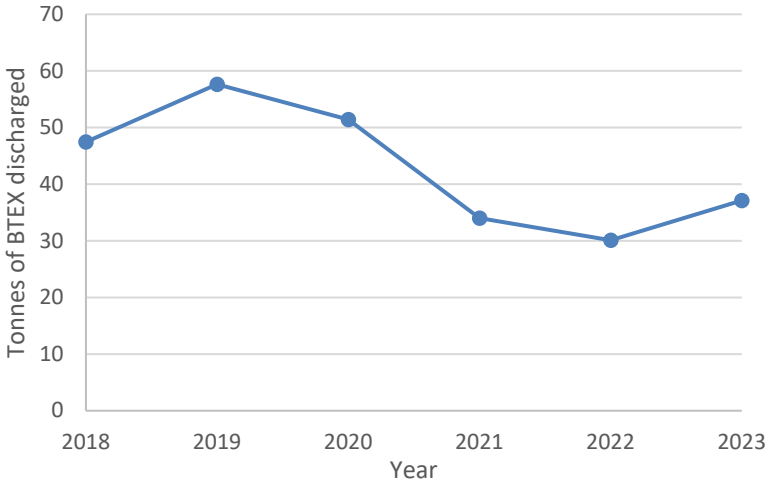

Figure 6: Discharge of dissolved oil (BTEX) on the NLCS, 2018-2023.

Discharges of dissolved oil (BTEX) in general decreased from 2018 to 2022, with a sudden increase in 2023 (Figure 6). This increase was caused by one installation and was due to a single measurement. Measurements taken before and after this occurrence showed lower concentrations of BTEX. From 2018 to 2023, BTEX

discharges decreased by 22% on the NLCS, which compares to a 32% decrease for the whole OSPAR Maritime Area. In 2023, approximately 1% of all BTEX discharged in the OSPAR area was discharged by The Netherlands' Industry.

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 Netherlands has prepared guidance for industry and adopted a phased implementation plan which allowed assessments to be evenly spread over the 2015 - 2018 period. The Netherlands used a whole effluent toxicity approach for the RBA assessments, with additional measures required only if the WET risk assessment indicated an unacceptable risk.

Currently, all oil and gas producing installations that discharge produced water on the Netherlands Continental Shelf have been evaluated according to the Dutch implementation plan of the RBA. This was a total of 73 installations. All 73 installations were subject to a risk likelihood screening (using a risk calculator (De Vries 2015)[1]), where it was determined what the likelihood was that the risk was not adequately controlled (defined as a likelihood of >0,5% that PEC/PNEC > 1 at 500 m). For eight installations, the likelihood was found to be >0,5% (six oil installations and two gas installations).

A selection was made of 13 installations where a full RBA analysis including whole effluent toxicity testing and substance-based evaluation was executed. These 13 installations included the six installations still operational that showed a likelihood of >0,5% of not meeting PEC/PNEC < 1 at 500m (four oil installations and two gas installations, two oil installations with likelihood >0,5% had since ceased production), plus an additional seven installations for which the likelihood was <0,5%.

For these 13 installations, WET testing was done. The two gas installations with a likelihood of >0,5% of not meeting the criteria, showed that the actual risk was acceptable. For these installations, PEC/PNEC was found to be <1 at 500m. The four oil installations assessed did indeed exceed PEC/PNEC > 1 at 500m. For all other installations, testing confirmed a PEC/PNEC of <1 at 500m. Of the four oil installations which did show an unacceptable risk, two have since ceased production. For the two oil installations still operational where the risk was found to be unacceptable, the risk driving substances were identified as two chemicals used. These have been substituted. As measures were taken to limit the risk at the two installations not meeting the criteria, there are currently no installations identified where the risk is not adequately controlled. For the two installations that substituted chemicals identified to be key substances, a reassessment is started at the end of 2023 to evaluate the effectiveness of the measures taken.

Operators evaluate annually if assessment is needed, based on discharge volumes. Assessment is needed when discharge volumes exceed 30 000 m^3 annually, as this correlates with a likelihood of 0,5% that PEC/PNEC will be >1 at 500m from the discharge point.

1

De Vries, Jak, Tamis. "A tool for calculating the risk distance according to the Dutch implementation of the risk based approach." 2015.

4.3 Spills of Oil to Sea

The number of oil spills to sea during the period 2018 - 2023 has varied, with a low of 3 spills in 2020 and 2022 and a high of 11 spills in 2021 (Figure 7). The quantity spilled varied from an annual total of 0,01 tonnes to 0,9 tonnes. No oil spills over 1 tonnes occurred.

In total, the amount of oil spilled on the NLCS (1,2 tonnes) was 0,36% (by weight) of the amount of dispersed oil discharged with produced and displacement water (333 tonnes) in the same six-year period.

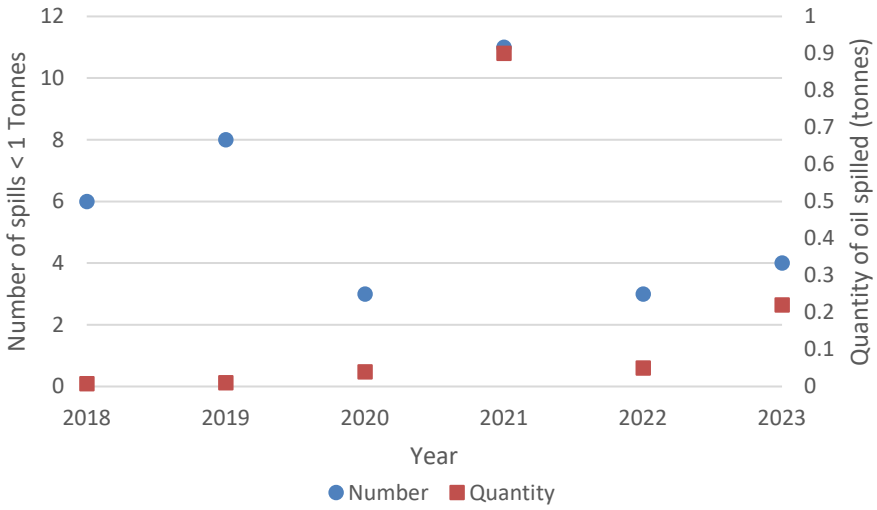

Figure 7: Number of oil spills and quantity of oil spilled on the NLCS, 2018-2023. No spills over 1 tonnes occurred in this period.

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 cuttings[2] and prohibits the discharge of cuttings contaminated with OBF[3] 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, 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.

5. Chemicals

Since 2001 the use and discharge of offshore chemicals have been managed by a number of OSPAR decisions, recommendations and agreements which the Netherlands implement into law through Article 9 of The Mining Regulations 2003. The regulation requires that offshore chemicals should be registered through submission of a harmonised offshore notification format (HOCNF) and use, and discharge of these chemicals is limited to what is strictly necessary for mining activities at sea.

The regulations and associated guidance require that chemicals are assessed for their impact to the environment using the Offshore Chemical Notification Scheme (OCNS) which is managed on behalf of the Netherlands by Cefas in the United Kingdom (UK). The OCNS uses the OSPAR Harmonised Mandatory Control

[2] OPF = Organic-phase Drilling Fluids

[3] OBF = Oil-based fluids

Scheme (HMCS) to rank chemical products according to Hazard Quotient (HQ), calculated using the Chemical Hazard and Risk Management (CHARM) model.

Details of the hazard categories within the HMCS are detailed in OSPAR Decision 2000/2 on a Harmonised Mandatory Control System for the Use and Reduction of the Discharge of Offshore Chemicals (as amended). In this report the term "Substitutable chemical" refers to chemicals which are or contain substances that are candidates for substitution, according to OSPAR Recommendation 2019/04 amending OSPAR Recommendation 2017/01 on a Harmonised Pre-screening Scheme for Offshore Chemicals. Substitutable chemicals include chemicals or substances which meet the criteria listed below. The HMCS category as used by the Netherlands is stated next to the criteria.

Substitutable chemicals include chemicals or substances which are:

- on the OSPAR List of Chemicals for Priority Action (LCPA) (*NL HMCS category A*),
- inorganic with Lethal Concentration (LC)50 or Effect Concentration (EC)50 less than 1 mg/l (*NL HMCS category B*),
- or are organic and have biodegradation less than 20% (*NL HMCS category C*), or
- meets two of three criteria (*NL HMCS category D*):
    - Biodegradation less than 60% but higher than 20%,
    - Bioconcentration Factor (BCF) larger than 100 or Log Pow ≥ 3, or
    - LC50/EC50 less than 10 mg/L.

Chemicals that are considered to 'Pose Little or No Risk' to the environment are referred to as PLONOR chemicals (*NL HMCS category P*). Chemicals that are considered to be PLONOR are detailed on the OSPAR PLONOR list (OSPAR Agreement 2013-06, as amended).

Chemicals that are neither PLONOR nor candidates for substitution include those that are:

- inorganic with LC50 or EC50 greater than 1 mg/l (*NL HMCS category E*);
- chemicals, which includes substances ranked according to OSPAR Recommendation 2019/04 and don't fall into another category (*NL HMCS category R*).

Pre-2020 the OSPAR reporting format had seven separate categories disclosed in Table 7a for use, discharge and spills of offshore chemicals. Since 2021, the current OSPAR reporting format has four categories (LCPA, Substitutable, Ranking or PLONOR) which summarise HMCS categories described above. For the purposes of this report the latter two chemical groups are combined and referred to as "Ranking" in alignment with the most recent standardised OSPAR reporting format for discharges, spills and emissions (OSPAR Agreement 2012-08, as amended).

5.1 Chemicals use and discharge

The total use and discharge of offshore chemicals on the Netherlands continental shelf (NLCS) has continued to decrease since the last assessment period 2013 – 2017. Comparing the average total use and discharge for 2018 – 2023 versus 2013 – 2017 a 55% reduction is observed for both use and discharge.

Over the current assessment period, 2018 – 2023, a 39% reduction in use was observed along with a steeper fall in associated discharge of 66%. During the reporting years 2019 – 2020, higher use (around 24 000 tonnes) occurred but discharge remained comparatively stable throughout the assessment period with no clear trends observed (Figure 8).

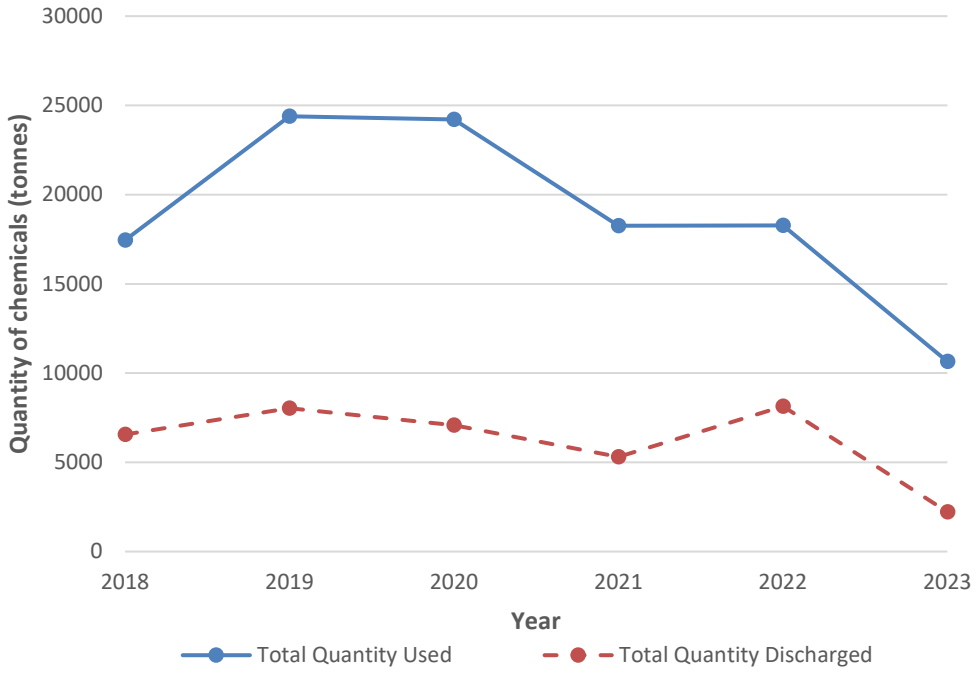

Figure 8: Total chemical use and discharge on the NLCS 2018-2023.

5.1.1 Chemicals Use

The average total quantity of chemicals used in the NLCS in 2013 – 2017 was 41 856 tonnes compared to 18 869 tonnes in 2018 – 2023, resulting in a 55% decrease with the smallest total use reported in 2023 (10 648 tonnes). The sudden fall in chemical use in 2023 could be due to reduced gas (and oil) production due to well ageing and limited reserves. This is confirmed by the increase in permits applications received by the regulator for Plug and Abandonment activities prior to decommissioning. In 2023, 81,4% (by weight) of the chemicals discharged were on the PLONOR list, 1,1% (by weight) of the chemicals used were Substitutable chemicals and 17,5% (by weight) of the chemicals used were Ranking chemicals.

At the time of writing average figures for the OSPAR Maritime Area over the assessment period 2018 – 2021 were available for comparison. OSPAR-wide average figures show that 69,6% (by weight) of chemicals used were PLONOR, 29,3% (by weight) of chemicals used were Ranking chemicals, and 1,1% were Substitutable chemicals or chemicals on the LCPA. The chemical use on the NLCS is showing favourable results in comparison to the wider OSPAR area with higher use of innocuous chemicals (PLONOR) and less use of Ranking chemicals but comparable amounts of Substitutable chemicals were used.

5.1.2 Chemicals Discharged

The average total use comparison of the two most recent assessment periods (2013 – 2017 vs 2018 – 2023) shows the same downward trend in the average total quantity of chemicals discharged in the NLCS in 2013 – 2017 (13 810 tonnes) vs 2018 – 2023 (6 221 tonnes), which is a reduction of 55% with the smallest discharge reported in 2023. In 2023, 90,1% (by weight) of the chemicals discharged were on the PLONOR list, 9,0% (by weight) of those discharged were Ranking chemicals and 0,9% (by weight) of the chemicals discharged were Substitutable chemicals. To promote phase out of discharge of Substitutable chemicals, only temporary permits for discharge are granted and only when no alternatives are available. In addition to this, operators are required to provide 'phase out plans' where the status of phasing out of discharge of Substitutable chemicals is explained.

Average figures for the OSPAR Maritime Area over the assessment period 2018 – 2021 are available for comparison. Just under 81,9% (by weight) of chemicals used were PLONOR, 17,4% (by weight) of chemicals discharged were Ranking chemicals with 0,7% being Substitutable chemicals or those on the LCPA. NLCS shows favourable results with higher discharge of innocuous chemicals (PLONOR) and lower discharge of Ranking chemicals compared to wider OSPAR figures.

5.2 List of Chemical for Priority Action (LCPA) chemicals

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 with 0% discharge of LCPA reported in both the 2013 – 2017 and 2018 – 2023 assessment periods.

5.3 Candidates for Substitution

The quantity of substances identified as candidates for substitution used during the period 2018 – 2023 varied considerably with 2019 showing a spike in use (279 tonnes). This is partially due to an increase in HMCS category C (highly persistent) chemicals being used, mainly caused by reclassification of chemicals: this increase in highly persistent chemicals could be due to the rejection of biodegradation test reports causing a change in HMCS to 0% or reassessed as less than 20% biodegradation (31,8% of cases were due to this reason). The increase in Substitutable chemicals used was noticed as one offshore operator resumed their offshore operations which were suspended for two years between 2017 and 2018. However, over the current assessment period the amount discharged has remained stable (below 5 tonnes per year or 1 – 2% of total use per year) until a sharp increase to 19 tonnes (16% of total use) in 2023 (Figure 9). In the NLCS, products with substitution warnings (HMCS D-B) are prohibited from discharge into the marine environment unless a safety and/or technical justification is provided. When HMCS categories change suddenly, there may be an unintentional discharge of Substitutable chemicals.

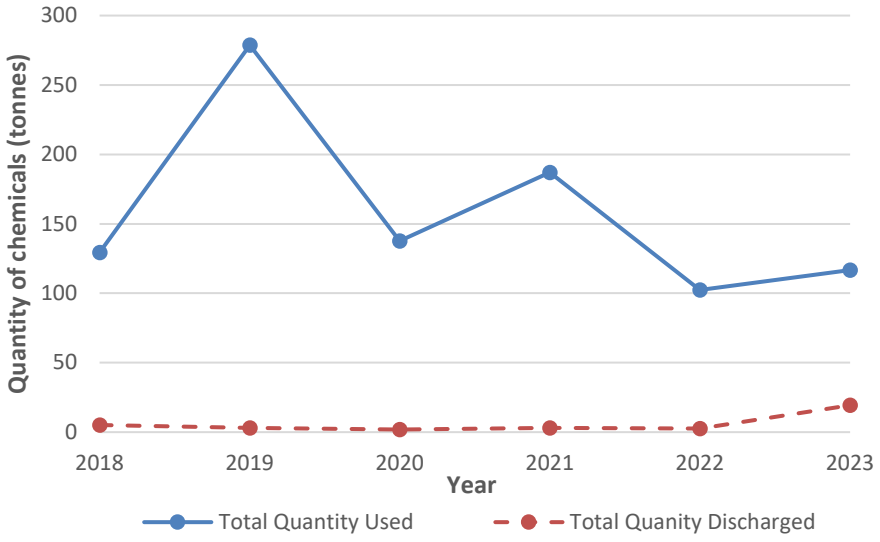

Figure 9: Use and discharge of chemicals which are candidates for substitution on the NLCS, 2018-2023.

Across the OSPAR Maritime Area there has been a 2,5% increase in the use of Substitutable chemicals between 2018 and 2021 (2022 – 2023 data not available at time of writing) and a 0,007% decrease in their discharge. The percentage of Substitutable chemicals that make up the total discharge has remained below 0,8%.

Since the last assessment period, additional requirements were agreed at OIC 2019, whereby chemical suppliers should provide new biodegradability data for chemicals that are classed as substances in solvent. This requires two separate biodegradation tests results for "substance in solvent" and solvent tested by itself, conducted at this same time. These requirements were added to OSPAR Agreement 2012-05 on the Guidelines for Completing the Harmonised Offshore Chemical Notification Format (HOCNF) in 2019 and was partially implemented by the Netherlands during this reporting period (2018-2023) as full implementation of this requirement happened after 31st of March 2024. As a result of this implementation a number of chemicals were re-categorised as highly persistent and therefore substitutable which may explain the notable increase in Substitutable chemicals being discharged in 2023.

Furthermore, the Netherlands have implemented thorough checks of molecular weight with respect to bioaccumulation potential of polymers with high partition co-efficient showing affinity to oil and lipid membranes and/or surfactants. During these checks molecular weight distribution data is collected in order to establish the proportion of a substance whose molecular weight falls below the figure of 700 Da (the bioaccumulation potential threshold under OSPAR pre-screening scheme). Cefas has agreed with NL and UK to consider 10% as the maximum proportion of material of molecular weight <700 that will fall within an assessment of "non-bioaccumulative". This criterion will be used until such time there is further advice from OSPAR. This requirement may partially explain an increase in substitution warnings in 2021 compared to other years. More substances that already fulfil one of the pre-screening criteria and which are now reassessed as potentially bio-accumulative would become a Substitutable chemical.

5.4 Ranking Chemicals

In the NL the use and discharge of Ranking substances has decreased by 58 % (by weight) and 64 % (by weight) respectively between 2018 and 2023 (Figure 10). The increase in use and discharge of Ranking substances in 2019 is likely due to replacement of some Substitutable chemicals as well as the re-categorisation of some PLONOR substances as Ranking substances, particularly sodium tetraborate and other boric acid containing chemicals.

Across the OSPAR Maritime Area the use of Ranking substances increased by just under 6% between the years 2018 and 2021 (data for 2022 and 2023 were unavailable at time of writing). Ranking chemicals were on average 29 % (by weight) of total use and 17 % (by weight) of total discharge over the available assessment period 2018 – 2021.

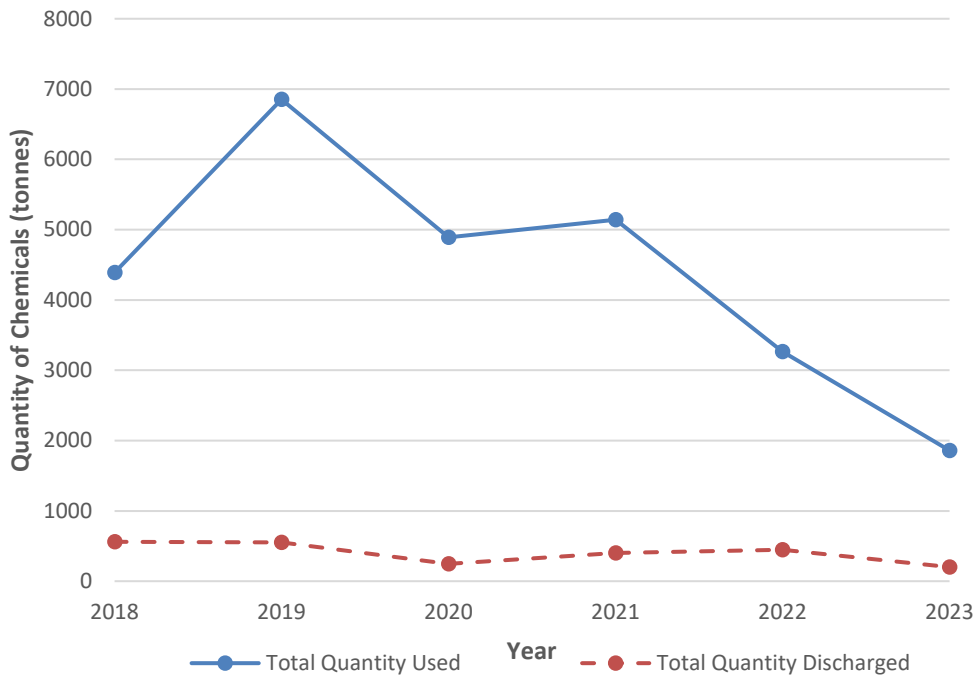

Figure 10: Use and discharge of Ranking Chemicals on the NLCS, 2018-2023.

5.5 Pose Little or No Risk (PLONOR) chemicals

For PLONOR substances the use and discharge has decreased by 54% (by weight) and 77% (by weight) respectively (Figure 11) reflecting the overall reduction in total use and discharge of chemicals on the NLCS during this assessment period. However, PLONOR chemicals still make up the majority of total use and discharge in 2023 (81% of total use and 90% of total discharge of offshore chemicals).

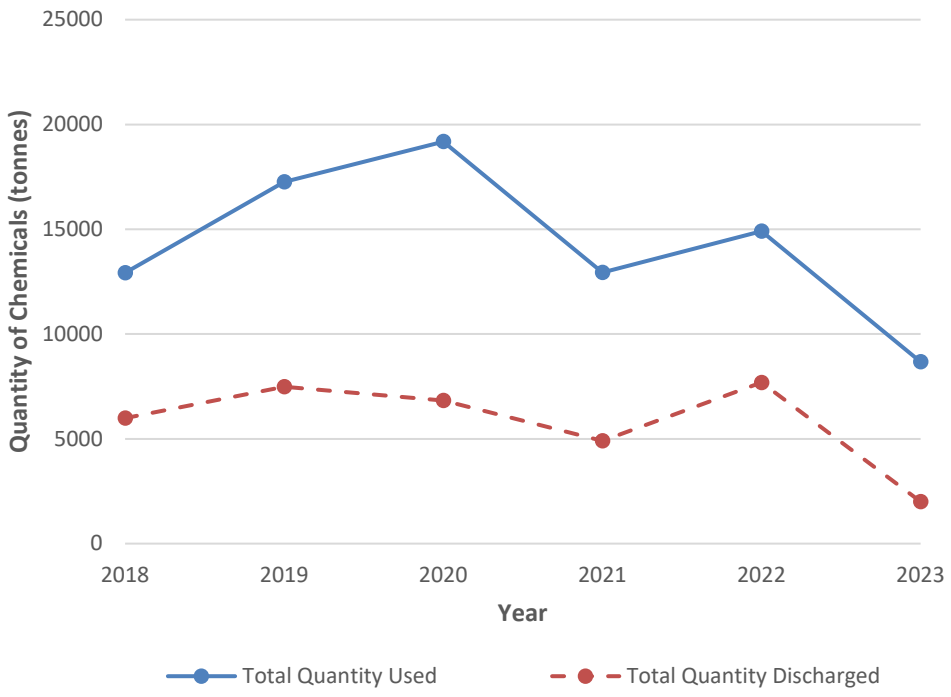

Figure 11: Use and discharge of PLONOR Chemicals on the NLCS, 2018-2023.

5.6 Plastics, Microplastics and Nanomaterials

The reporting of plastics, microplastics and nanomaterials started in 2020 onwards, so at present there are four years of data for the NLCS (Figure 12). The increase in use of plastic and microplastic discharge in 2021 is likely due to the increase in declaration of plastics on the HOCNF from chemical suppliers with a decrease in use in subsequent years as awareness of plastics in offshore products increased.

The ability to flag plastics, microplastics and nanomaterials on product templates and the ranked list of products generated by Cefas has not been achievable until November 2023 despite the reporting requirement coming into force in 2020. Therefore, further reductions in use and subsequent discharge are predicted in the next assessment period as operators will have greater awareness of which products contain these types of substances. Although there is currently no regulatory action (i.e. discharge prohibited) for products flagged as containing plastics, microplastic and nanomaterials, many of these components would receive a substitution warning under the HMCS and therefore discharge is still strictly regulated.

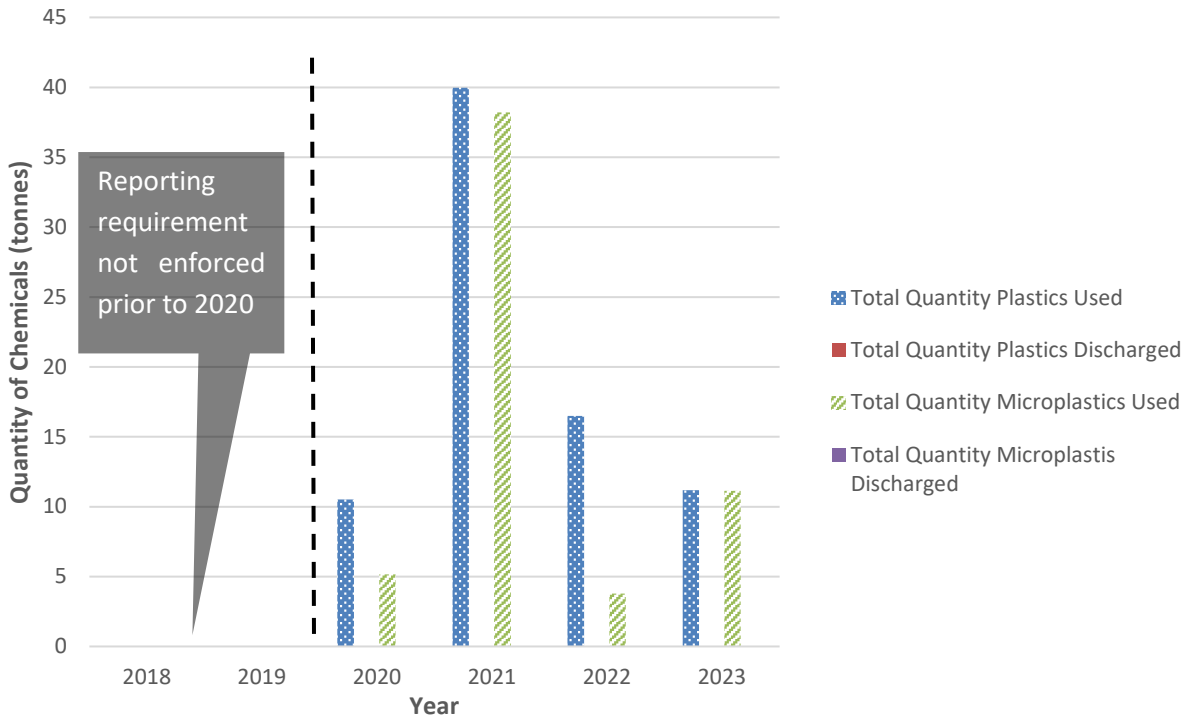

Figure 12: Use and discharge of plastics and microplastics on the NLCS, 2018-2023.

It should be noted that data is still being assessed and collated for use and discharge of plastics, microplastics and nanomaterials. Further information regarding this process can be found in *Chapter 7: Summary of Counting & QA Procedures in The Netherlands relating to OSPAR Data*.

5.7 Chemical Spills

Incidences of spills have remained fairly constant throughout the reporting period. The quantity of the spills has fallen sharply from 2018 to 2023, with the vast majority (>80%) of chemicals spilled being categorised as PLONOR, 13% Ranking substances and approximately 1% Substitutable chemicals (Figure 13). No spills contained plastic, microplastics or nanomaterials, however the reporting requirement is still in the process of being enforced and therefore data is currently limited.

Notably, 2018, saw an increase in the volume of spills which resulted in two individual spills totalling 18 tonnes and one smaller spills at less than 1 tonnes. 2019 saw an increase in number of spills, with four spills at less than 1 tonnes and one spill with a volume of 5,4 tonnes. From 2020 onwards, there have been no spills over 1 tonnes.

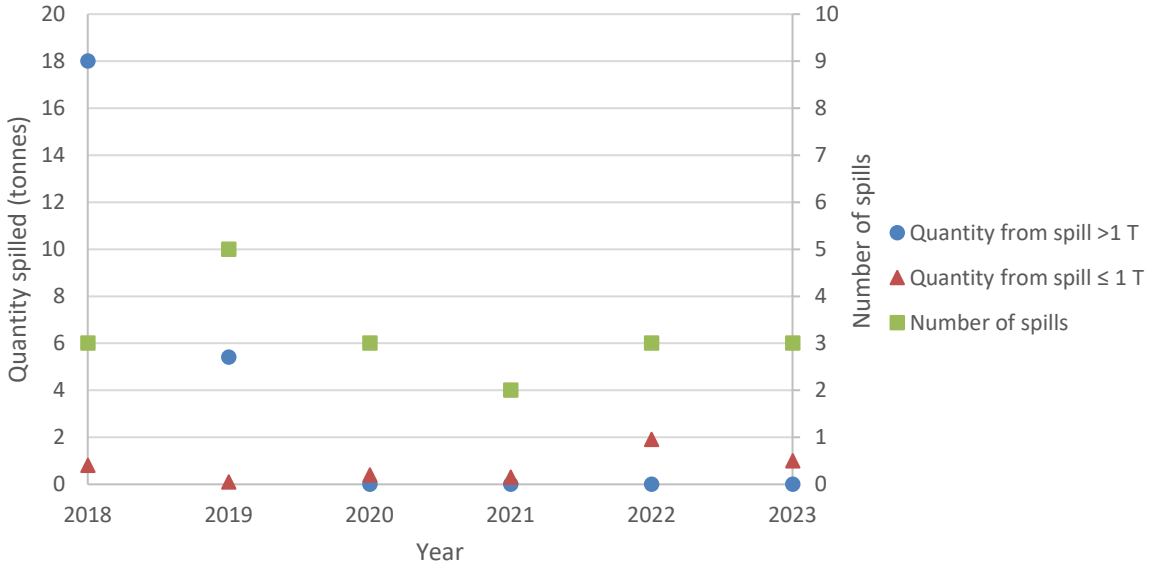

Figure 13: Chemical spills on the NLCS, 2018-2023. Data from Tables 5c, 5d and 7c (Annex 2) are used.

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.

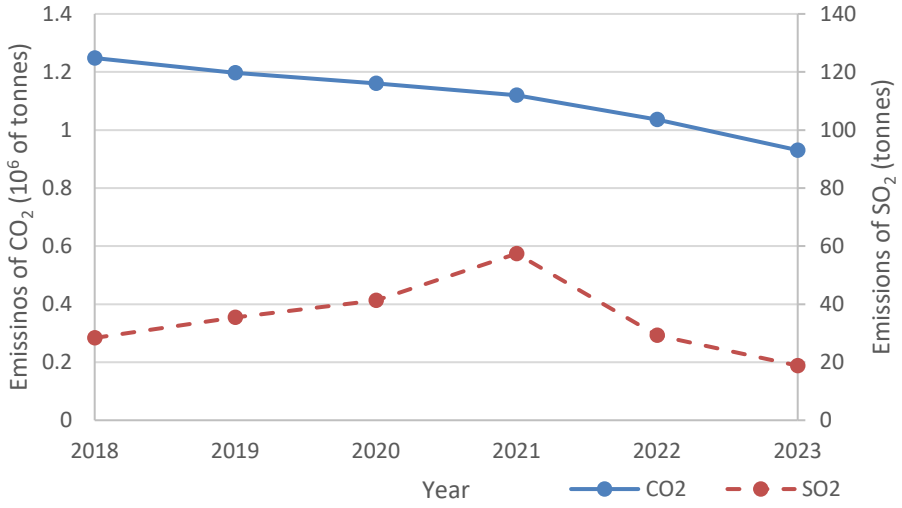

Figure 14: Emissions to air on the NLCS (CO_2 and SO_2), 2018-2023.

CO_2 emissions have decreased by approximately 25% on the NLCS, which is similar to the 27% decrease observed for the entire OSPAR Maritime Area. 4% of CO_2 emissions for the OSPAR Maritime Area were emitted by the Netherlands' industry. The SO_2 emissions on the NLCS increased until 2021, after which emissions decreased. This was caused partially by operators switching to ultra-low sulphur diesel for drilling operations. Overall, SO_2 emissions on the NLCS decreased by 34% from 2018 to 2023, which compares to a decrease of 43% for the entire OSPAR Maritime Area over the same period. 0,8% of SO_2 emissions for the OSPAR Maritime Area were emitted by the Netherlands' industry. See Figure 14.

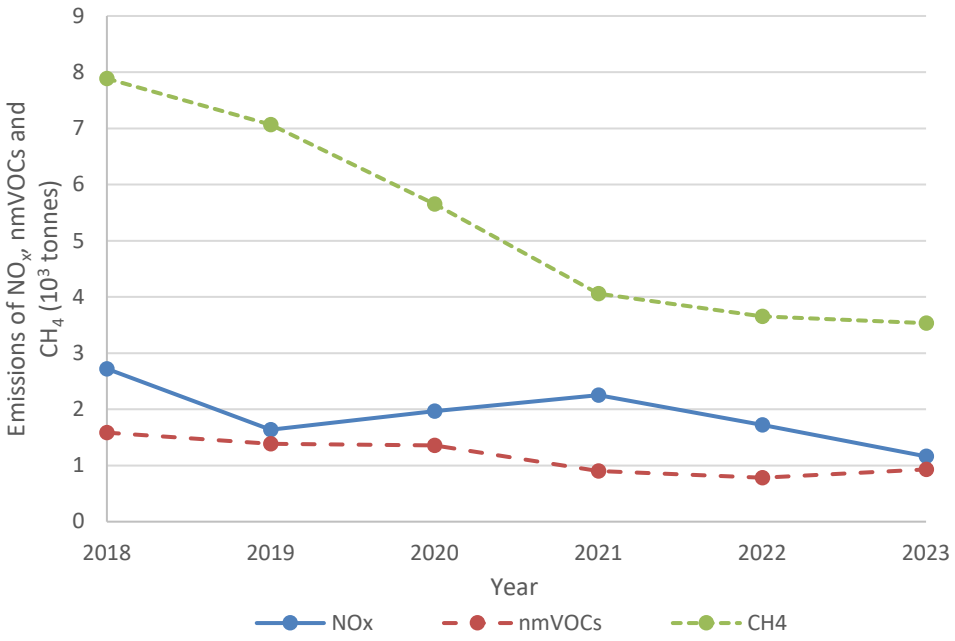

Figure 15: Emissions to air on the NLCS (NO_x, nmVOCs, CH_4), 2018-2023.

Between 2018 and 2023, CH_4 emissions decreased by 55%, comparing to a 58% reduction for the OSPAR Maritime Area. In 2023, 10% of the total CH_4 emissions in the OSPAR Maritime Area was emitted by Netherlands industry. NO_x-emissions fluctuated, but emissions were 57% lower in 2023 when compared to 2018. For the entire OSPAR Maritime Area, NO_x-emissions decreased by 25% over the same period. In 2023, approximately 1,5% of all NO_x emissions for the OSPAR Maritime Area were emitted on the NLCS. Emissions of nmVOCs decreased by 41%, comparing to a 54% decrease for the OSPAR Maritime Area. In 2023, 2% of all nmVOCs emissions for the OSPAR Maritime Area were emitted on the NLCS. See Figure 15.

In general, atmospheric emissions on the NLCS reduced between 2018 and 2023. It is likely that reductions in atmospheric emissions are largely caused by a reduced production of oil and gas. To evaluate this, emissions are calculated per unit produced, see Figure 16.

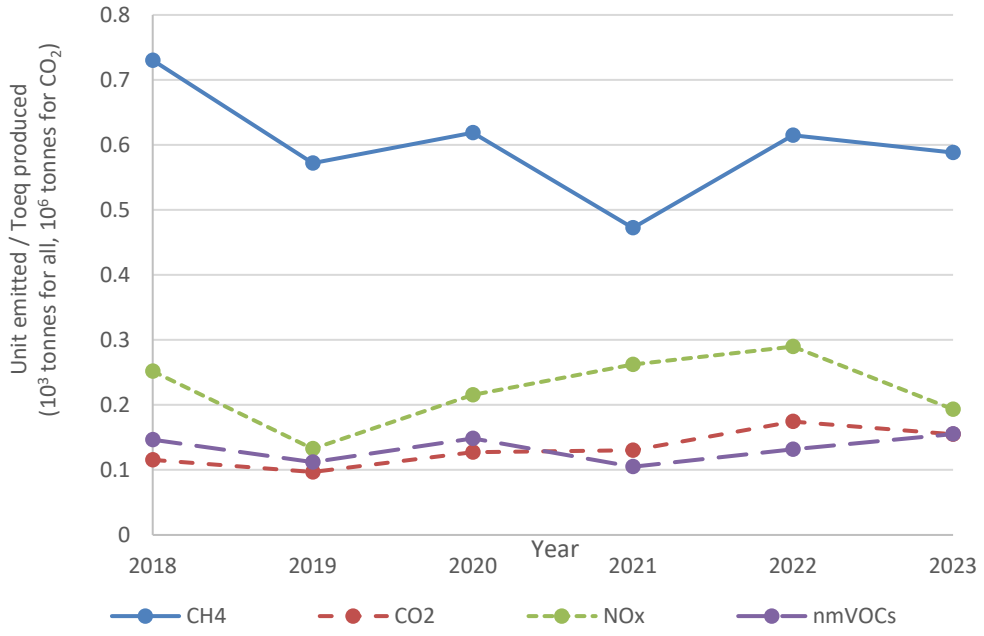

Figure 16: Atmospheric emissions per Toeq produced on the NLCS from 2018 to 2023. The units used are the units presented previously: CO_2 is presented as 10^6 tonnes per Toeq, all other emissions are presented as 10^3 tonnes per Toeq.

Atmospheric emissions per produced tonnes oil equivalent fluctuated, but overall remained relatively constant for all emissions over the assessed period, suggesting that reductions observed in Figure 14 and Figure 15 were indeed largely due to a decrease in production. An exception is CH_4, which shows a decrease of approximately 19% from 2018 to 2023 for tonnes emitted per produced tonnes oil equivalent, and SO_2, where no trend could be observed. The reduction of tonnes CH_4 emitted per production unit could be due to a CH_4 reduction programme that was launched in 2018, where measures were taken by operators to actively reduce CH_4 emissions.

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

7.1.1 Counting of Installations

For OSPAR, the counting of installations is detailed in the "Inventory of oil and gas offshore installations in the OSPAR maritime area". The number of installations reported in the annual "Discharges, Spills and Emissions from Offshore Oil and Gas installations" report, only comprises installations with discharges to the sea and/or emissions to the air. This Country Assessment report is based on the annual "Discharges, Spills and Emissions from Offshore Oil and Gas installations" report and therefore only includes installations with discharges or emissions.

7.1.2 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.

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.

7.1.3 Reporting of Chemical Use and 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 and the Mining Regulations. Operators are required to report the use and discharge to the NL regulator annually. Permitted use and discharge might be compared with 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.

For the data related to plastics, microplastics and nanomaterials, it should be noted that:

1. data is still being assessed and collated for a number of plastics, microplastic and nanomaterial substances according to the current definitions stipulated by OSPAR and therefore the reported figures are likely to be underestimated or subject to change as new definitions are implemented and suppliers provide greater evidence in support of the accepted definitions over the coming years;

2. nanomaterials have not been reported as there is insufficient data available on which to base a reasonable estimate. Cefas will continue to request information from chemical suppliers if nanomaterials are flagged on the HOCNF or Cefas suspect that a product contains a nanomaterial;

3. microplastic and plastic substances will include the plastic coating from proppants where chemical supplier didn't specify coating of the proppant as only microplastic or only plastic. It is therefore expected that the total use and discharge of plastic substances will always be greater than microplastics because plastic data would also contain microplastic data.

7.1.4 Reporting of Atmospheric Emissions

Operators are required to report atmospheric emissions by an electronic reporting format on an annual basis. Emissions reported to SSM are reviewed by SSM and the Emission Registration to identify any unusual results.

Annex 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 Platforms[4]

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

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: 2002-08)

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 2017/1 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

[4] PARCOM Recommendation of a 40 mg/l Emission Standard for Platforms, 1986 was superseded by 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.

Annex 2: Data Annexes

Table 1a: Number of installations in The Netherlands maritime area with discharges to the sea, or emissions to the air 2018-2023

2018	2019	2020	2021	2022	2023
100	101	92	93	92	85

Table 1b: Number of installations by type of installation in The Netherlands maritime area with discharges to the sea, or emissions to the air, 2018-2023

Year	2018	2019	2020	2021	2022	2023
Oil	8	8	8	8	7	5
Gas	92	93	84	85	85	80
Total	100	101	92	93	92	85
Wells drilled	13	13	7	10	10	4

Table 2a: Oil discharged in displacement and produced water, 2018-2023. Dispersed.

Year	2018	2019	2020	2021	2022	2023
Quantity (tonnes)	56	72	74	52	35	48
Concentration (mg/L)	10	12	10	7	10	15

Table 2b: Oil discharged in displacement and produced water, 2018-2023. Dissolved/BTEX.

Year	2018	2019	2020	2021	2022	2023
Quantity (tonnes)	47	58	51	34	30	37

Table 2c: Annual quantity of produced and displacement water discharged to the sea (in m^3), 2018-2023

Year	2018	2019	2020	2021	2022	2023
Quantity in m^3	5 802 873	6 223 815	7 354 817	5 656 991	3 614 452	3 430 396

Table 2d: Volume of produced water and displacement water discharged, and produced water injected (in m^3/year), 2018-2023

Year	2018	2019	2020	2021	2022	2023

Produced water	5 568 984	5 985 422	3 390 850	5 451 196	3 390 850	3 169 168
Displacement water	233 889	238 393	223 602	205 795	223 602	261 228
Injected produced and displacement water	5 809 976	6 406 167	2 672 896	4 743 494	2 672 896	2 304 797

Table 3a: Number of installations with discharges exceeding 30 mg oil/l, and quantity of oil discharged by these installations (in tonnes)

Year	**2018**	**2019**	**2020**	**2021**	**2022**	**2023**
Number of installations	0	0	1	0	0	0
Oil discharged (tonnes)	0	0	0,779	0	0	0

Table 4a: Quantities of oil and other organic-phase fluids discharged via cuttings (in tonnes), 2018-2023

Year	**2018**	**2019**	**2020**	**2021**	**2022**	**2023**
Total OPF	0	0	0	0	0	0

Table 4b: Number of wells drilled with OPF, with discharge of contaminated cuttings to the maritime area, 2018-2023

Year	**2018**	**2019**	**2020**	**2021**	**2022**	**2023**
OBF	0	0	0	0	0	0
Other OPF	0	0	0	0	0	0

Table 5a: Number of oil spills, 2018-2023 - Spills less than 1 tonne (≤ 1 T) and spills above 1 tonne (> 1 T)

Year	**2018**	**2019**	**2020**	**2021**	**2022**	**2023**
≤ 1 T	6	8	3	11	3	4
> 1 T	0	0	0	0	0	0

Table 5b: Total quantity of oil spilled, in tonnes, 2018-2023

Year	**2018**	**2019**	**2020**	**2021**	**2022**	**2023**
≤ 1 T	0,008	0,01	0,04	0,9	0,05	0,2
> 1 T	0	0	0	0	0	0

Table 5c: Number of spills of chemicals, 2018-2023 – Spills less than 1 tonne (≤ 1 T) and spills above 1 tonne (> 1 T)

Year	2018	2019	2020	2021	2022	2023
≤ 1 T	2	4	3	2	3	3
> 1 T	1	1	0	0	0	0

Table 5d: Amount of chemical spills in tonnes/year, 2018-2023

Year	2018	2019	2020	2021	2022	2023
≤ 1 T	0,8	0,1	0,4	0,3	1,9	
> 1 T	18	5,4	0	0	0	

Table 6a: Emissions to air, CO_2 (in millions of tonnes), 2018-2023

Year	2018	2019	2020	2021	2022	2023
CO_2	1,25	1,20	1,16	1,12	1,04	0,93

Table 6b: Emissions to air, NO_x (in thousands of tonnes), 2018-2023

Year	2018	2019	2020	2021	2022	2023
NO_x	2,72	1,64	1,97	2,25	1,72	1,16

Table 6c: Emissions to air, nmVOCs (in thousands of tonnes), 2018-2023

Year	2018	2019	2020	2021	2022	2023
nmVOCs	1,58	1,39	1,36	0,90	0,78	0,93

Table 6d: Emissions to air, CH_4 (in thousands of tonnes), 2018-2023

Year	2018	2019	2020	2021	2022	2023
CH_4	7,89	7,07	5,65	4,06	3,65	3,53

Table 6e: Emissions to air, SO_2 (in tonnes), 2018-2023

Year	2018	2019	2020	2021	2022	2023
SO_2	28,4	35,5	41,3	57,4	29,3	18,8

Table 7a: Quantity of offshore chemicals used in kg/year, 2018-2023

Year	2018	2019	2020	2021	2022	2023
PLONOR	12 920 162	17 258 287	19 177 418	12 934 583	14 903 644	8 671 887
Ranked	4 390 474	6 852 291	4 890 513	5 139 621	3 265 845	1 859 341
Substitutable	129 363	278 666	137 787	187 003	102 384	116 586
LCPA	0	0	0	0	0	0

Table 7b: Quantity of offshore chemicals discharged in kg/year, 2018-2023

Year	2018	2019	2020	2021	2022	2023
PLONOR	7 553 982	5 994 055	7 476 238	6 824 339	7 689 499	2 001 456
Ranked	560 316	552 734	248 004	400 897	445 270	201 082
Substitutable	5 213	3 044	1 889	3 159	2 595	19 342
LCPA	0	0	0	0	0	0

Table 7c: Chemicals spilled in kg/year

Year	2018	2019	2020	2021	2022	2023
List of Chemicals for Priority Action	0	0	0	0	0	0
Inorganic LC_{50} or EC_{50} < 1 mg/l*	0	0	0	0	0	0
Biodegradation < 20%*	300	0	0	0	0	0
Substance meets two of three criteria*	0	0	0	0	0,4	0
Inorganic, LC_{50} or EC_{50} > 1 mg/l	0,04	0	3 000	0	0,4	0
PLONOR	20 479	0	0,5	312	0	1 000
Ranking	300	0	0	0	0	0

* Chemicals for substitution.

Table 7d: Quantity of offshore plastics, microplastics and nanomaterials used in kg/year, 2020-2023

Year	2020			2021			2022			2023		
	Plastics	Microplastics	Nanomaterials	Plastics	Microplastics	Nanomaterials	Plastics	Microplastics	Nanomaterials	Plastics	Microplastics	Nanomaterials
Quantity (kg)	10 512	5 159	0	39 967	38 212	0	16 492	3 786	0	11 181	11 133	0

Table 7d: Quantity of offshore plastics, microplastics and nanomaterials discharged and spilled in kg/year, 2020-2023

Year	2020			2021			2022			2023		
	Plastics	Microplastics	Nanomaterials	Plastics	Microplastics	Nanomaterials	Plastics	Microplastics	Nanomaterials	Plastics	Microplastics	Nanomaterials
Discharged (kg)	0	0	0	5	0	0	0	0	0	0	0	0
Spilled (kg)	0	0	0	0	0	0	0	0	0	0	0	0

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

Year	2018	2019	2020	2021	2022	2023
Production (toeq)	10 797 787	12 353 528	9 136 337	8 591 956	5 939 611	6 007 435

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