OSPAR COMMISSION

Protecting and conserving the North-East Atlantic and its resources

Assessment of the discharges, spills and emissions from offshore installations on the Norwegian Continental Shelf in 2012-2016

Offshore Industry Series

2018

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.

Assessment of the discharges, spills and emissions to air on the Norwegian Continental Shelf 2012-2016

Contents

Executive Summary

This report presents the discharge, spill and emission data from offshore oil and gas operations on Norwegian Continental Shelf (NCS) over the period 2012–2016 and the assessment of the data. The annual data is provided in Annex 1.

Level of Activity

The Norwegian Continental Shelf (NCS) is a mature petroleum region. There is still however a high activity level, with 248 wells drilled in 2016 and large discoveries made in the last few years. Total gross production increased with approximately 15 % between 2012 and 2016.

Discharges & spills

The total quantity of *dispersed*[1] *oil (aliphatic oil)* discharged to sea from produced water and displacement water increased during the 2012–2016 period.

Produced water is the main contributor to the oil discharges from the petroleum industry. The volume of produced water discharged increased between 2012 and 2016, mainly due to the increased water production which typically occurs as fields mature. Injection increased some during this period, this is however not reflected in reported discharges because the main contributors to water production on the NCS do not inject or inject very little produced water. Discharge of displacement water remained stable in the assessment period. .

The annual average dispersed oil content in produced and displacement water increased over the period. A maximum of five installations on the NCS in any one year failed to meet the performance standard for oil content as an annual average. However, these installations typically had small discharge volumes as they reinjected most of their produced water. The total amount of oil discharged with water exceeding the performance standard was highest in 2014 and 2016 with 10,5 tonnes and 15,7 tonnes respectively, compared to around 3 tonnes the other years during the 2012-2016 period.

The total number of oil spills to sea showed a reduction of almost 68 % on the NCS between 2012 and 2016., with the largest reduction between 2013 and 2014. The large reduction is mainly a consequense of a clarification in 2013 of the categories oil and chemical spills.

Chemicals

There was a marked increase in total use and discharge of chemicals from 2012 to 2013, mainly due to higher drilling activity. Both use and discharge of chemicals has reduced since, largely following the level of drilling activity. Most of the chemicals used and discharged are non-substitution chemicals.

---

[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.

The total quantity of chemicals *used* offshore in 2016 was 398 158 tonnes out of which 71% (wt.) were on the PLONOR list and another 28 % were other non-substitution chemicals, while 1 % of chemicals were substitution chemicals. There were no use or discharge of LCPA-substances in 2016.

Total quantity of chemicals *discharged* into the sea in 2016 was 103 360 tonnes on the NCS. 86,1 % (wt.) of these were listed on the PLONOR list and another 13,8 % were other non-substitution chemicals. No chemicals were on the LCPA list and 0,1 % were other substitution chemicals.

The number and quantity of chemical spills varies over the assessment period and no clear discernible trend is observed.

Atmospheric Emissions

Emissions of CO_2 remained relatively stable across the assessment period, and variations are mostly related to variations in the production levels. NOx- and SO2-emissions have reduced in the assessment period, which is mainly explained by reduced activity from mobile units. Reported emissions of methane reduced, mainly due to new emission factors. Emissions of nmVOCs increased between 2013 and 2014, as new methods for measurement and calculation was implemented. The increase is however small compared to the deacresing trend since 2001, in which the reported nmVOC emissions have been reduced due to regulation of emissions from offshore loading, resulting in i.e. implementation of vapour recovery units on the ships.

Introduction

This report provides an assessment of the discharges, spills and emissions to the North Sea from offshore oil & gas installations on the Norwegian Continental Shelf (NCS) during the period 2012–2016. The purpose of the report is to assess trends related to the effectiveness of the OSPAR measures and the national regulation. Trends have been assessed using expert judgement and not by statistical analyses.

The assessment is based on data submitted by the operators on the NCS to the Norwegian authorities and reported by Norway in the annual OSPAR report on discharges, spills and emissions from offshore oil and gas installations. The assessment is based on the data available for the NCS at the time when the annual OSPAR report was submitted (Annex 1).

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

- "OSPAR report on discharges, spills and emissions from offshore oil and gas activity in 2014" (OSPAR Commission 2016)
- "Draft OSPAR report on discharges, spills and emissions from offshore oil and gas installations in 2015" (OSPAR Commission 2018)

It should be noted that as Norway is the largest oil and gas producer in the OSPAR region, emissions and discharges on the NCS contribute significantly to the total emissions and discharges in the OSPAR area. OSPAR trends may therefore to a certain degree be driven by trends on the NCS, making a comparison of performance challenging.

The operators have used procedures for sampling and analysis given by the Norwegian Environment Agency (NEA), and quality assurance procedures described by NEA and the Norwegian Oil & Gas Association. Certified laboratories have been used.

Setting the scene

Norway is the largest producer of oil and gas in the OSPAR region. There is however still a high activity level on the Norwegian continental shelf, with 248 wells drilled in 2016 and large discoveries med in the last few years. In recent years the petroleum exploration has moved north, in particular to the Barent Sea.

Figure 1 shows the official Norwegian production data in millions of tonnes oil equivalents (o.e.). Total gross production increased with approximately 15 % between 2012 and 2016.

The number of installations with discharges has remained quite stable since 2012.

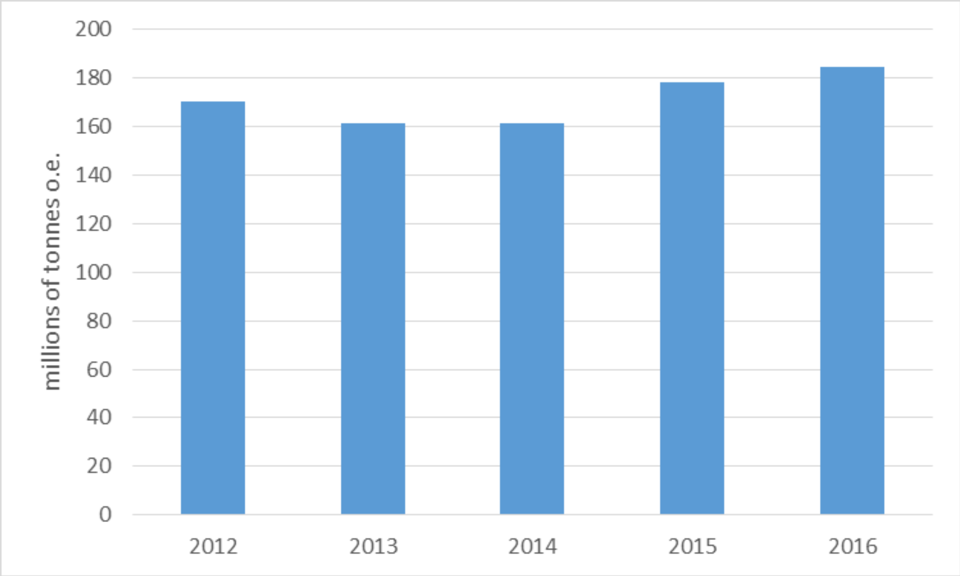


Figure 1: Annual total production of oil equivalents on the Norwegian Continental Shelf

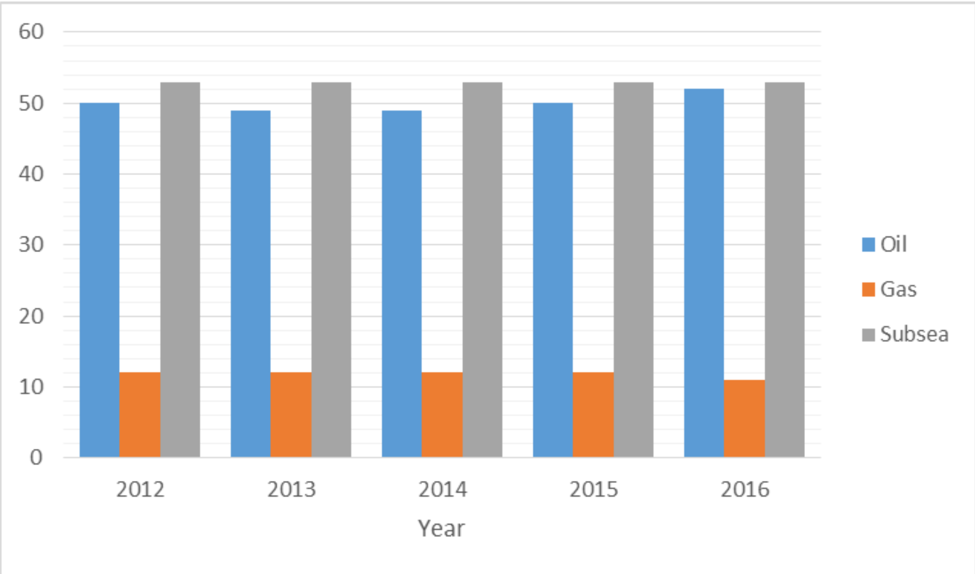


Figure 2: Number of installations on the Norwegian Continental Shelf

On the NCS, wells are reported in the year drilling is completed. Sidetracks are reported as separate wells when the aim of the sidetrack is to reach new targets or explore new geological areas. A change of well path due to difficulties during drilling is not counted as a separate well.

The reported drilling activity on the NCS increased between 2012 and 2016, as shown in Figure 3.

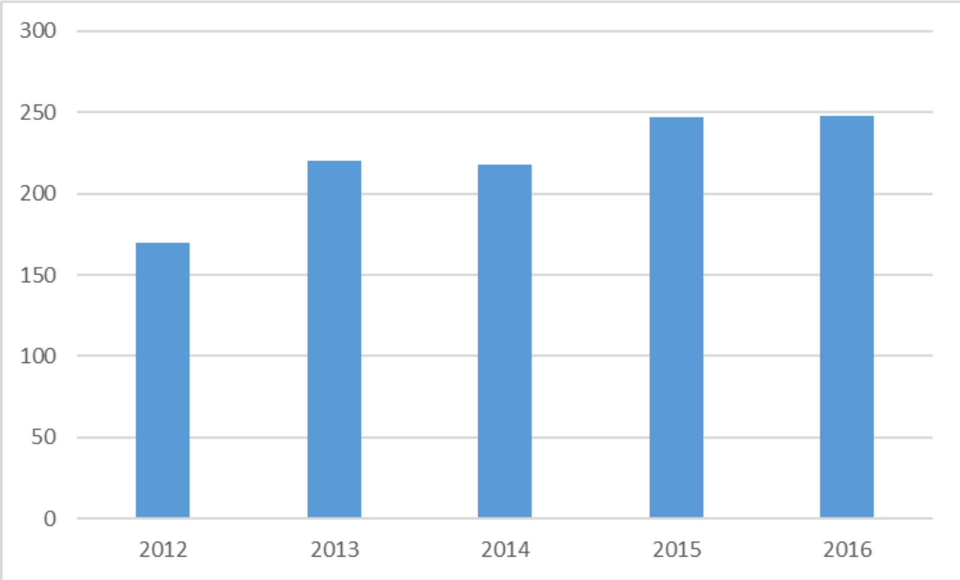


Figure 3: Number of wells drilled on the Norwegian Continental Shelf

Environmental Management

As required in OSPAR Recommendation 2003/5 to Promote the Use and Implementation of Environmental Management Systems (EMS), Norwegian legislation requires the industry to have an EMS (Framework HSE regulation, Section 17, Duty to establish, follow up and further develop a management system). Operators may either have a certified EMS (ISO 14001 or EMAS) or an EMS that is in accordance with the principles of such a standard. The authorities do not issue formal approval related to their EMS. However, all audits examine parts of the EMS system, and failing to have one will have grave consequences for the operator, including withdrawal of the licence.

Requirements to document such management systems are stated in the HSE regulations, Framework regulation § 23 and Management regulation §§ 24 and 42.

Oil discharges

Discharges of oil to sea

Discharges of dispersed oil are regulated in accordance with OSPAR Recommendation 2001/1 (as amended). Norwegian regulations state that the oil content shall be *as low as possible*. In addition, it is required that the oil content should not exceed 30 mg/L dispersed oil as a monthly avarage.

Produced water and displacement water

Produced water discharges on the NCS increased by about 5 % from 2012 to 2016 (Figure 4). This seems to coincide with the increased production of water, which typically occurs as fields mature. Even though injection of produced water has increased by 33 % from 2012 to 2016, the percentage produced water injected (24 %) is still small compared to the amount being discharged (76 %). Almost 60 % of the discharges of produced water comes from four large and mature fields. These fields do not inject or inject very little produced water.

Discharge of displacement water remained stable in the assessment period.

Comparing this with OSPAR overall figures, shows that:

- The discharges of produced water and displacement water were relatively stable during the 2012-2016 period both on the NSC and in the OSPAR area as a whole.

Discharges on the NCS accounts for approximately half of the discharges in the OSPAR area, and changes in Norwegian dicharges will therefore be reflected in OSPAR figures.

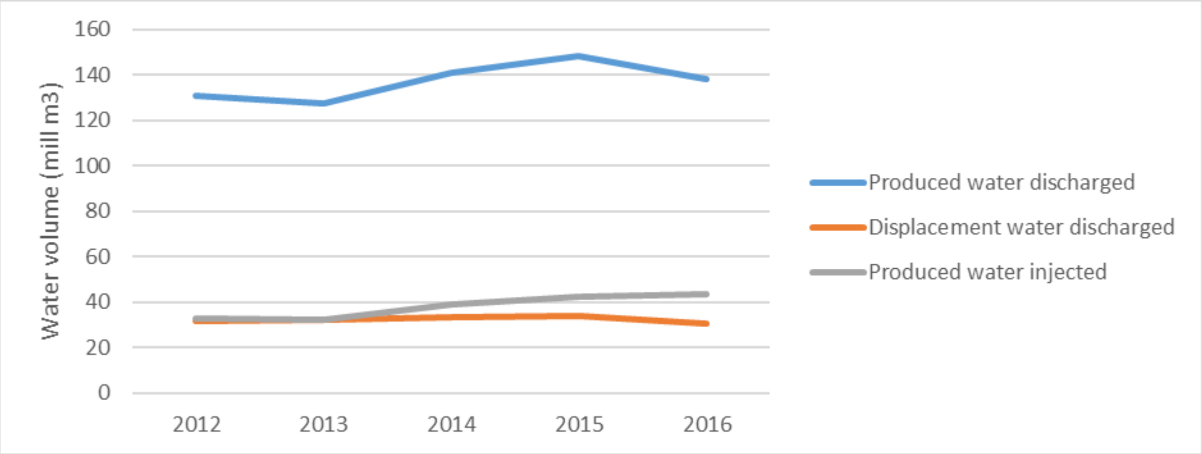


Figure 4: Discharges and injection of produced water and displacement water on the NCS 2012—2016

Dispersed oil discharged

The total quantity of dispersed oil discharged with produced water and displacement water seems to have had an increasing trend since 2012, however a small decrease was seen from 2015 to 2016 (Figure 5). The increase in discharges between 2012 and 2016 was approximately 9 %. The average dispersed oil concentration in produced water and displacement water remained stable over the assessment period (Figure 5).

The figures for dispersed oil dicharged with produced and displacement water in the OSPAR area vary, and no temporal trend can be observed over the 2012—2016 period. The average concentration on the NCS similar to the average concentration in the OSPAR area in 2016.

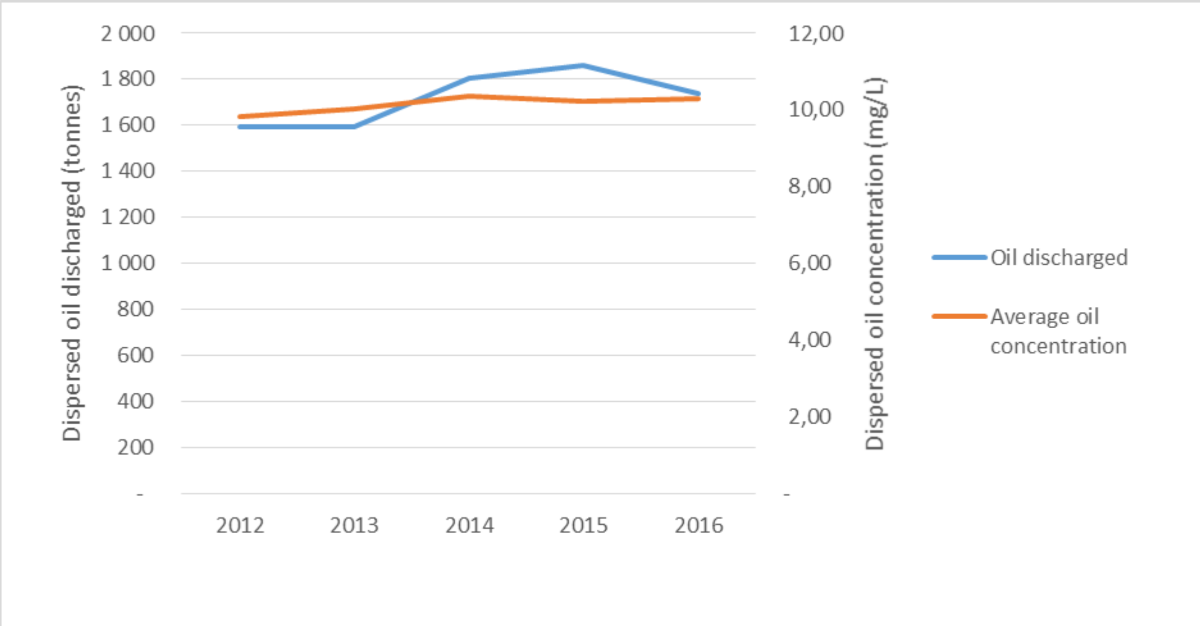


Figure 5: Quantity and concentration of dispersed oil discharges 2012—2016

The performance standard in Recommendation 2001/1 has been 30 mg/l calculated as a monthly average since 2007. Few installations failed to meet this limit, only five in 2016 (Figure 6). Their reason for not reaching the goal was mainly that they rely on produced water injection, and when the injection falls out, small quantities of water with high concentrations of dispersed oil are discharged. These installations could discharge produced water over a longer period in order to stabilise the water cleaning process, and thereby reducing the average oil concentration, but Norwegian authorities have rather decided to accept higher concentrations of oil for very short periods in order to minimize the total discharge of oil.

The quantity of oil discharged with this water in the 2012-2016 period ranged between 3 and 16 tonnes (Figure 6). The peak in 2014 was due to a fall out in injection on one field over a period of five months in 2014 and while the peak in 2016 resulted from problems with produced water quality due to challenging workovers and well start-ups on another field.

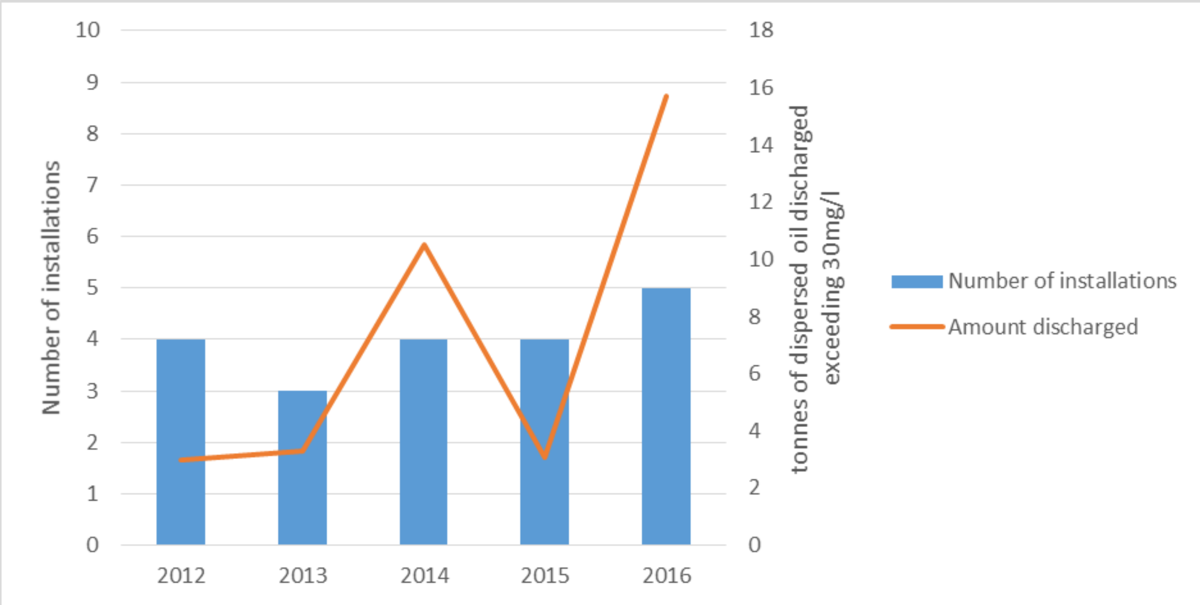


Figure 6: Installations failing to meet performance standards for concentration of oil in water discharged and amount oil discharged because of the excess in concentration

Norway also reports the dissolved oil content (as represented by BTEX components) in produced water discharges. OSPAR has not issued recommended discharge levels for these components as they rapidly biodegrade in seawater once discharged. The discharge of dissolved oil[2] (BTEX) in produced water increased over the assessment period by 20 %. Increasing BTEX concentrations in produced water explains much of the increased dicharges. However the reason for the concentrations changes remain unknown. Discharge of BTEX in the OSPAR area has increased by 7 %.

Risk-based Approach (RBA)

In 2012, OSPAR adopted Recommendation 2012/5 for a risk-based approach to the management of produced water discharges from offshore installations. Norway has implemented the Recommendation by issuing specific requirements in the permits for the installations discharging produced water. These requirements are now included in the HSE regulations for the petroleum industry. All operators discharging produced water have to perform and report new substance based risk assessments, resulting in calculated field specific Environment Impact Factors (EIFs). One EIF refers to a volume of water of 100 000 m^3 where the PEC/PNEC ratio exceeds 1 for one or more components in the produced water.

The Norwegian operators have been performing risk assessments and implemented risk reducing measures since the late 1990s. The work was evaluated in 2003, 2005, 2006, 2010 and finally in

[2] "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.

2016. There was an overall risk reduction, expressed as the reduction of EIF, on the NCS in the period 2002—2008. However, risk has since increased.

It is not dispersed oil that contribute to the highest risk at many fields, but added chemicals and natural occuring components in oil. The effect of cleaning technology on natural occuring components will vary, and injection can sometimes be the only solution to reduce risk. Reduced use and/or substitution of added chemicals are other ways to reduce the overall risk.

Spills of oil to sea

The total number of oil spills to sea showed a reduction of almost 68 % on the NCS between 2012 and 2016, with the largest reduction between 2013 and 2014 (50 %). The large reduction is mainly a consequense of a clarification from the Environment Agency in 2013 of the categories oil and chemical spills. For instance, spills of hydraulic fluids had previously often been reported as oil spills, while from 2014 on they will have been reported as chemical spills. The decrease in number of oil spills from 2013 to 2014 is therefore seen as an increase of number spills of chemicals. The majority of the spills were smaller than 1 m^3.

The quantity of oil spilled has shown larger variations, as expected since it is mainly driven by the small and variable number of spills larger than 1 m^3. The volume spilled in 2014 stands out in the 2012 to 2016 period and is mainly caused by three different spills on three different fields.

Comparing figures from NCS to overall figures from OSPAR indicates the following:

- Between 2012 and 2016 there was a reduction in the number of total spills on the NCS, while the number of spills in the OSPAR area has been quite stable, varying from 425 (2012) to 572 (2014). Spills on the NCS have constituted a relatively small proportion of total spills in the OSPAR area the last couple of years.
- The total volume spilled on the NCS was variable, with no apparent trends.Between 2012 and 2016, there was an decrease in the total volume spilled in the OSPAR region, which seems to be due to reductions on the UKCS. We refer to the UK assessment report for 2012-2016 for further information on this.

The amount of oil spilled on the NCS was less than 8 % (wt.) of the amount of dispersed oil discharged with produced water in the same period.

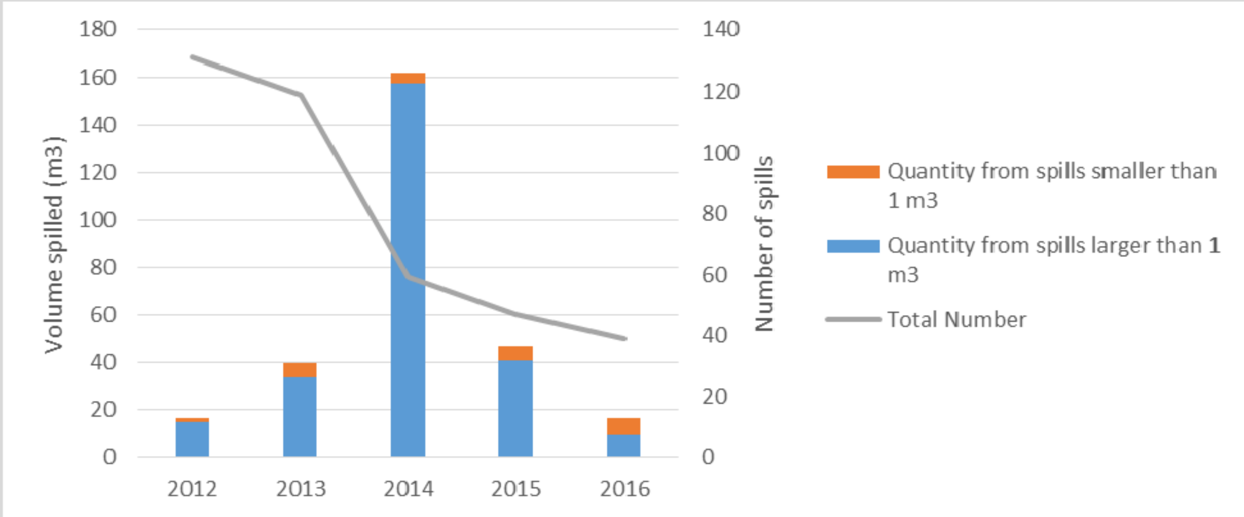


Figure 7: Quantity and number of oil spills on the NCS 2012—2016

Discharges of organic phase fluids

Discharge of cuttings contaminated with organic phase fluids (OPF) at a concentration greater than 1% by weight on cuttings is prohibited based on OSPAR Decision 2000/3. Norway regulates this under the Activities regulations section 68. Technologies able to reduce the concentration of oil to below the 1 % limit exist today.

In 2015 one field on the NCS, Martin Linge, got permission to discharge cuttings drilled with oil based mud when reducing the concentration of oil to no higher than 0,05 %. The operator discharged a total of 2460 tonnes of cuttings drilled with oil based mud during 2015. They were however not able to clean the cuttings to 0,05 % oil concentration and discharge of oil cuttings was stopped. The concentration of oil on the cuttings was however below 1 %.

In 2016 permission was granted to discharge cuttings drilled with oil based mud from the field Johan Sverdrup. Included in the terms for the permission, is that the oil concentration on cuttings discharged should not exceed 0,3 %, with an ambition to reach a concentration of 0,1 %. Startup of the operation is expected in 4Q 2019.

Chemicals

Chemical Use & Discharge

In this report, the term *substitution chemical* is short for *chemicals which contain one or more substances which are candidates for substitution*, according to OSPAR Recommendation 2010/4. This includes chemicals which are

- on the OSPAR LCPA,
- inorganic with LC_{50} or EC_{50} 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 $P_{ow} \geq 3$, or
- LC_{50}/EC_{50} less than 10 mg/L.

The goal of OSPAR Recommendation 2006/3 was for substitution chemicals to be phased out by 1 January 2017. In addition OSPAR Recommendation 2005/2 set a goal that Contracting Parties should have phased out the discharge of substitution chemicals on the OSPAR 2004 List of Chemicals for Priority Action (LCPA) by 1 January 2010. There are no OSPAR measures for the other categories of chemicals classified within HMCS, as these are deemed not to pose a significant risk to the environment.

The Norwegian Pollution Control Act states that all pollution is illegal, and discharges and emissions from industry requires a permit. All use of chemicals (except for emergency use) needs a permit. The permit states the volume of chemicals allowed to be used, and the volume allowed to be discharged. Use of substitution chemicals is only permitted if they are necessary for safety or technical reasons.

In addition, the HSE regulations for the petroleum industry states that evaluation, ranking and choice of chemicals is the operator's responsibility. The authorities do not register individual chemicals, but the operators on the NCS run a common database where all chemicals are registered. The authorities have access to all information.

There was a marked increase in total use of chemicals from 2012 to 2013, mainly due to higher drilling activity, resulting in an increased use of drilling chemicals (Figure 8). The same increase is not applicable for discharge mainly because more of the chemicals used were injected. Most of the chemicals used and discharged were non-substitution chemicals. Both use and discharge of chemicals has reduced since, largely following the level of drilling activity.

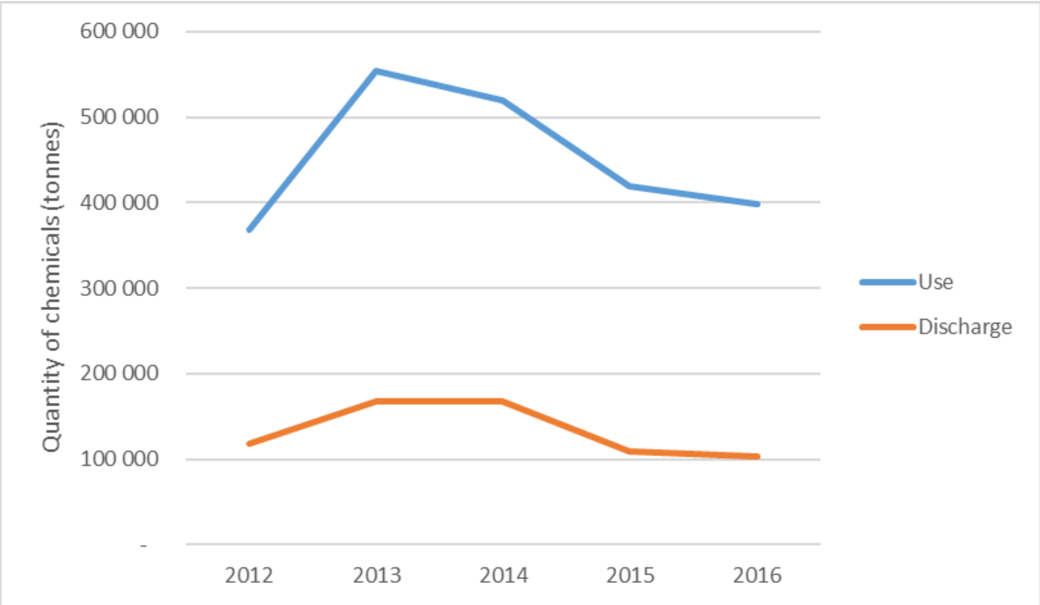


Figure 8: Total quantity of chemicals used and discharged on the NCS 2012—2016

Chemicals Used

The total quantity of chemicals used offshore in 2016 was 398 158 tonnes out of which 71 % (wt.) were on the PLONOR list and another 28 % (wt.) were other non-substitution chemicals, while 1 % of chemicals were substitution chemicals. There were no use or discharge of LCPA-substances in 2014, 2015 or 2016. However due to unauthorised use of cleaning chemicals 3,4 kg and 5,6 kg LCPA-substances were reported both used and discarged in 2012 and 2013 respectively (Figure 9).

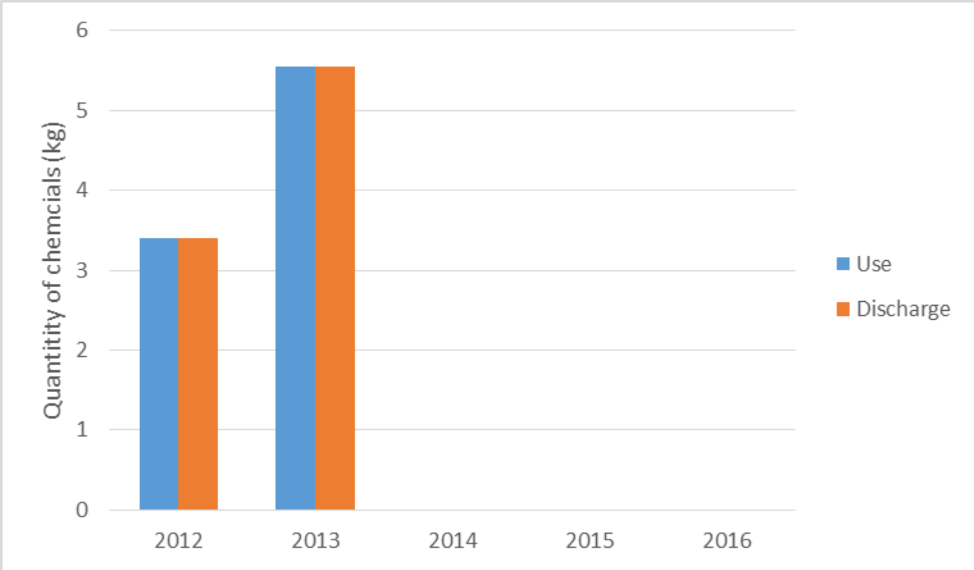


Figure 9: Quantities of chemicals on the List of Chemicals for Priority Action (LCPA) used and discharged on the Norwegian Continental Shelf 2012—2016

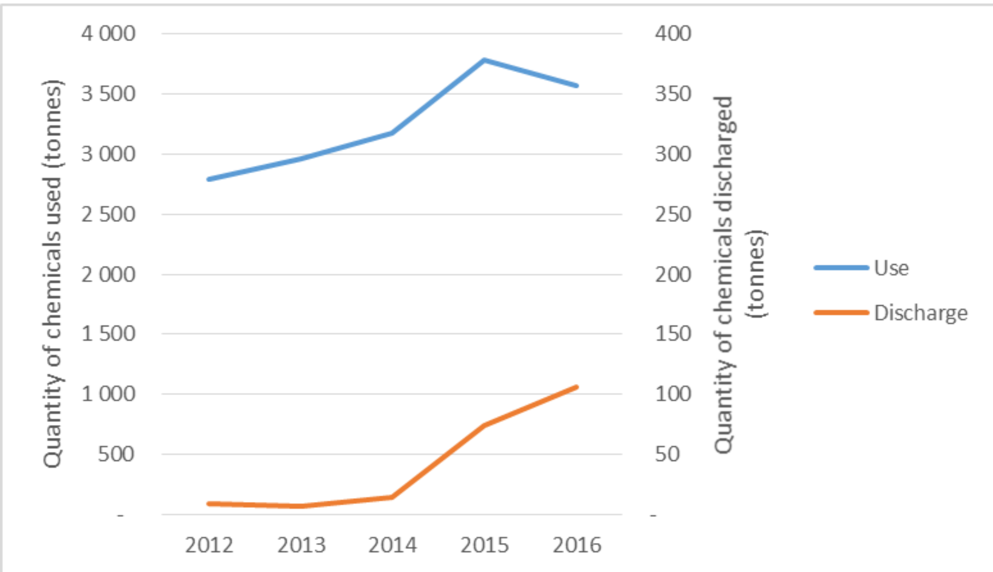
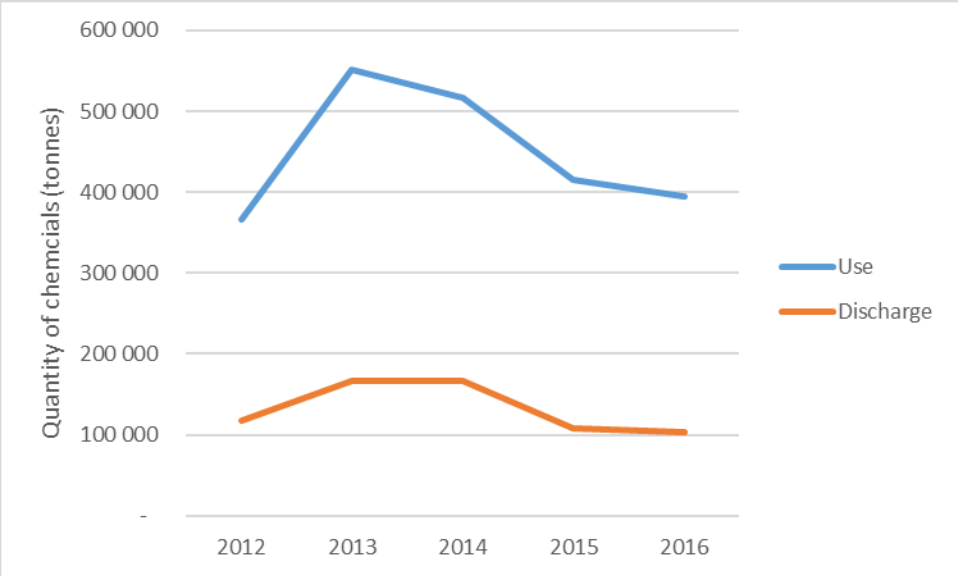


Figure 10: Quantities of other substitution chemicals (exept LCPA chemicals) used and discharged 2012—2016



Figur 11: Quantities of chemicals not containing substitution candidates used and discharged 2012-2016

According to OSPAR documents, the figures for 2016 demonstrate that 71 % of chemicals used were chemicals on the PLONOR list, almost 28 % were other non-substitution chemicals and 1 % were chemicals on the LCPA list or other substitution chemicals. Thus, the percentage relationship between the prescreening categories in the OSPAR area coincides with the quantity chemicals on the NCS.

Chemicals Discharged

Total quantity of chemicals discharged into the sea in 2016 was 103 360 tonnes on the NCS. 86 % of these were listed on the PLONOR list and another 14 % (wt.) were other non-substitution chemicals. Only 0,1 % were substitution chemicals; No chemicals from the LCPA were discharged.

According to OSPAR, 83 % of the the corresponding overall figures for 2016 were reported as chemicals on the PLONOR list, 15 % as other non-substitution chemicals and 0,1 % chemicals on the LCPA or other substitution chemicals. Thus, very similar compared to discharges reported on the NCS.

There were no LCPA chemicals used or discharged in 2014, 2015 or 2016. Of LCPA listed chemicals 3 and 5,6 kg were both used and discharged in 2012 and 2013 respectively. This was due to unauthorised discharge of cleaning chemicals, which has been addressed and stopped.

The discharge of substitution chemicals increased from 2012 to 2016 from about 9 tonnes in 2012 to about 106 tonnes in 2016. This is mainly due to the reclassification of sodium hypochlorite as a substitution candidate and the inclusion of firefighting chemicals in the reporting scheme in Norway during this period.

Chemical Spills

The number of spills varies and no clear temporal trend is observed. However, there is an increase between 2013 and 2014 which may be ascribed to a clarification from the Environment Agency in 2013 of the categories oil and chemical spills (see also chapter 4.3). The total quantity of chemicals spilled to sea was 365 m^3 in 2012 and 38 m^3 in 2016. However, there are large variations between years and no clear trend is observed.

In the OSPAR area there seems to be relative stable in the number of spills, varying from 421 to 488 in the 2012—2016 period. The quantity of chemical spills vary from 1009 tonnes in 2016 to 2152 tonnes in 2015.

Consequently,

- no clear trend is observed in the number of chemical spills on the NCS, nor in the OSPAR area

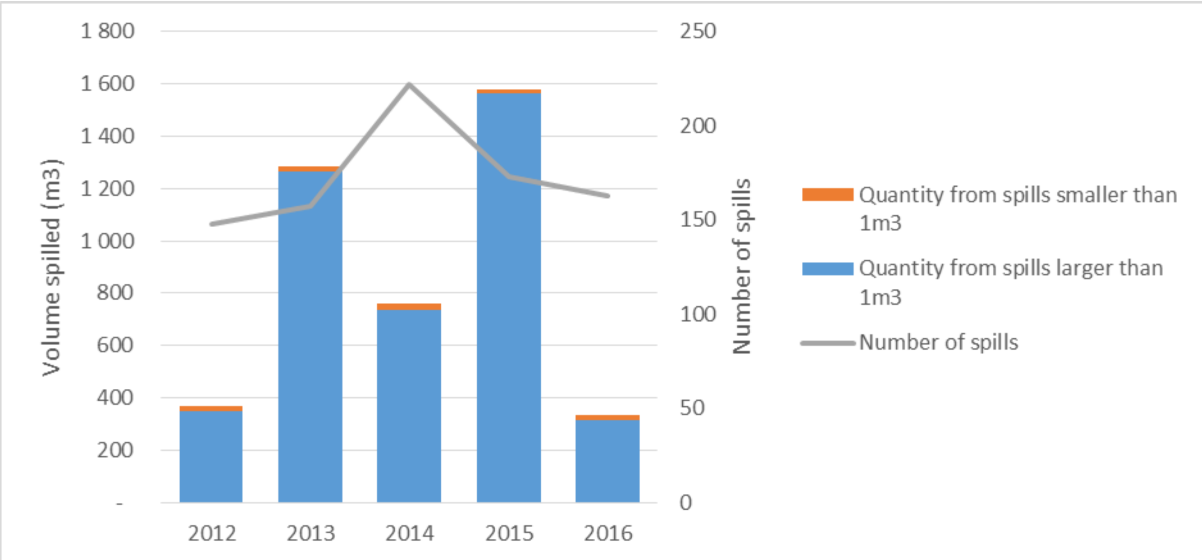


Figure 12: Number and quantity of chemical spills on the Norwegian Continental Shelf 2012—2016

Emissions to air

Atmospheric emissions are not covered by OSPAR measures or harmonised OSPAR measuring methodologies, but in Norway the atmospheric pollutants reported to OSPAR are regulated under Norwegian legislation. The atmospheric emissions from the Norwegian petroleum activities are reported annually to OSPAR.

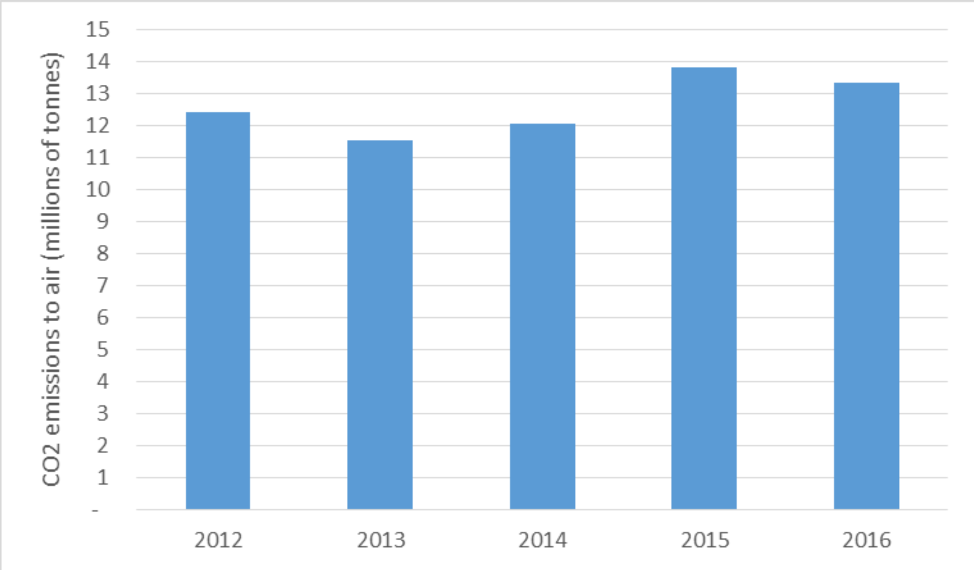


Figure 13: Emissions of CO_2 on the Norwegian Continental Shelf 2012—2016

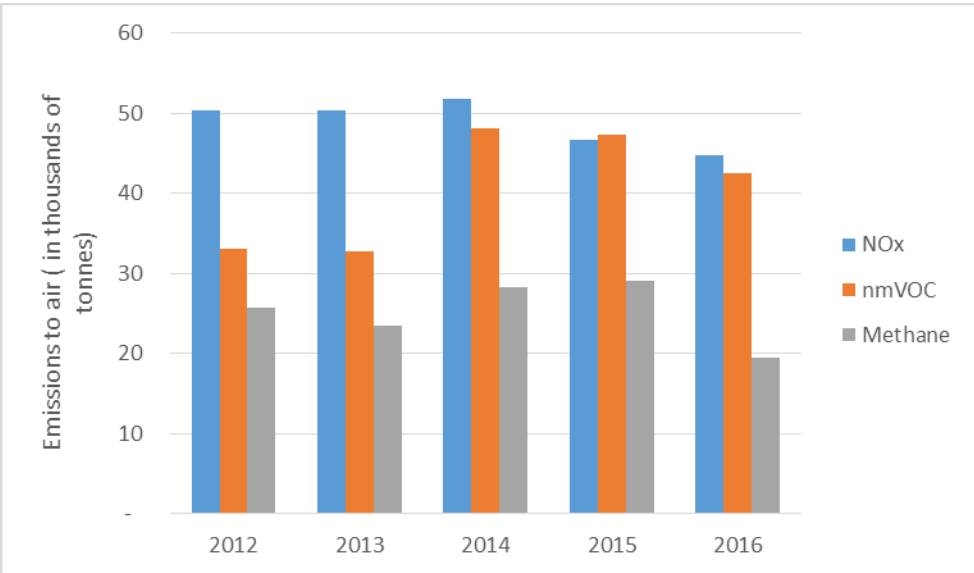


Figure 14: Emissions of NOx, methane and nmVOC on the Norwegian Continental Shelf 2012—2016

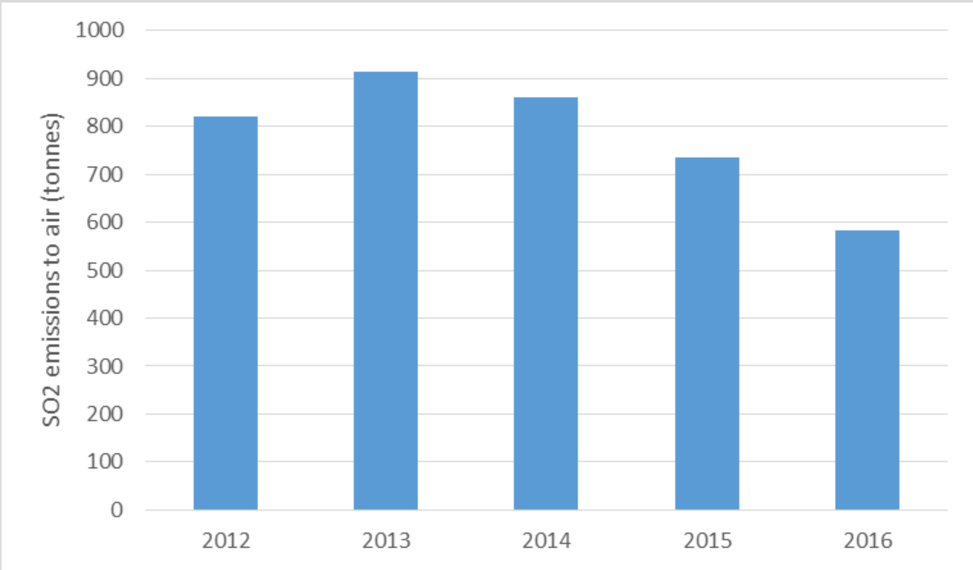


Figure 15: Emissions of SO_2 on the Norwegian Continental Shelf 2012—2016

Emissions of CO_2 varied between 11,6 and 14,1 mill tonnes (Figure 13), and variations are mostly related to variations in the production levels. NOx emissions have also reduced in the assessment period, which is mainly explained by reduced activity from mobile units (Figure 14). Reported emissions of methane reduced by more than 30 % between 2015 and 2016 (Figure 14). This is mainly due to new emission factors. Emissions of nmVOCs increased between 2013 and 2014, as new methods for measurement and calculation was implemented. The increase is however small compared to the deacresing trend since 2001, in which the reported nmVOC emissions have been reduced due to regulation of emissions from offshore loading, resulting in i.e. implementation of vapour recovery units on the ships. (Figure 14). Finally, emissions of SO_2 is reduced since 2013 (Figure 15). Like the reduced NOx-emissions, this is mainly due to reduced activity from mobile units.

.

Comparing Norwegian figures to OSPAR overall figures, we find:

- CO_2-emissions remain fairly stable both on the NCS, and in the OSPAR area.
- NOx emissions have reduced on the NCS. The decrease on the NCS has been offset by an increase on the UKCS, rendering the emissions in the OSPAR area fairly stable.
- Reported methane emissions have reduced both on the NSC and in the OSPAR area. This seems, in both instances, to be largely due to new calculation methods on the NCS.
- Non-methane VOCs have increased by 29 % on the NCS and by 5 % in the OSPAR area.
- SO_2 emissions is reduced on the NCS, especially since 2013. This decrease is not reflected in the figures for the OSPAR area, as UK is a much larger contributor to SO2-emissions.

Counting of installations & QA procedures in Norway

Counting of installations

In OSPAR, the number of installations is detailed in the "Inventory of oil and gas offshore installations in the OSPAR maritime area ". However, since the number does not only include drilling and production installations, but also for example concrete foundations for bridges and gangways, the number does not clearly indicate the level of drilling and production activity.

Therefore, in the annual reports to OIC from Norway, the number of installations are counted in the following way:

One installation with discharges to water and air may be a fixed or floating drilling and/or production installations ("mother installations") including sub sea wellhead templates with wells transferring oil and gas to the mother installations. The operator of the mother installation may or may not be the operator of the templates. Normally, the discharges are covered by one permit from the Norwegian Environment Agency. The mother installation may consist of more than one structure. An example is Statoil's Norne field, which consists of the Norne FPSO, 6 Norne templates, three Urd templates (covering the Svale and Star reservoirs), one Alve template and one Marulk template belonging to Eni (not shown on the picture).

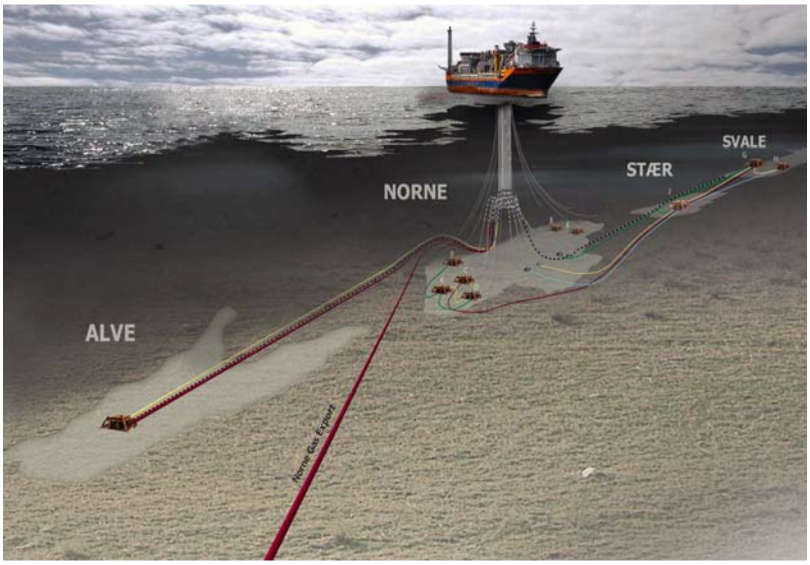


Figure 16: The Norne field

One field may have more than one installation which due to their size, complexity and integrity are counted individually. An example is the Statfjord field, which with three concrete base installations, and including the sub sea fields Statfjord East, Statfjord North and Sygna, are counted as 3.

A third example may be the Ekofisk field, with about 32 installations above the sea surface, counted as 6 installations in OIC context. Discharges from drilling and from water treatment plants are done from these 6, and other discharges such as hydraulic fluids may be discharges from other installations, but these discharges also reported.

Figure 17: The Ekofisk field

In other cases, a field may be developed by drilling all wells from one single installation, in which case it is counted as one.

The intention is that the change in number of installations shall reflect the change in activity. The decommissioning of installations and development of new fields will be commented upon in future assessment reports.

Reporting requirements and quality assessment

The operators are required to report annually according to specifications from the Norwegian Environment Agency. Data related to drilling, production, discharges of water and oil, energy production and emissions to air, the use and discharge of chemicals, waste production and handling, etc, is entered into a common database. This database has been developed by the Norwegian Oil and Gas Association, and is paid for by the industry themselves.

The quality of data submitted is the responsibility of each operator. They are required to carry out systematic review of their own data. In addition, each operator has access to most data from the other operators. This enables them to compare and contrast their data to data from the other operators, and to relate them to data for previous years. The Norwegian Oil and Gas Association also carries out some quality assurance, but does not have any formal requirement from the authorities to do so.

Sampling and analysis has to be done according to national or international standards. The standards will be specific for each type of sample and each analysis. The operators have to include details related to this in their management systems. The authorities may any time request to see the documentation.

The operators have a requirement to evaluate uncertainties in the reported numbers, and the results shall be included in the annual report. However, this is a difficult task, and we do not yet have a good procedure for how to assess the operators' conclusions, and act upon them. We need more experience, and we have cooperation with the parts of our organisation which deal with reporting from land based industry to find a way forward.

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 Platforms[3];

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.

[3] 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.

Data Annexes

Table 1: Number of installations on the NCS with discharges to the sea, or emissions to the air 2012—2016

	2012	2013	2014	2015	2016
Oil	50	49	49	50	52
Gas	12	12	12	12	11
Subsea	53	53	53	53	53
Others	0	0	0	0	0

Table 2: Oily aqueous discharges to the maritime area

Table 2a: Oil discharged in displacement and produced water (in tonnes), 2012—2016

2012	**2013**	**2014**	**2015**	**2016**
Dispersed	Dispersed	Dispersed	Dispersed	Dispersed
1 593	1 595	1 805	1 859	1 698

Table 2b: Dissolved oil discharged in displacement and produced water (in tonnes), 2012—2016

2012	**2013**	**2014**	**2015**	2016
BTEX	BTEX	BTEX	BTEX	BTEX
1 855	1 920	1 910	2 269	2 221

Table 2c: Total volume of produced water and displacement water discharged, and produced water injected (in m^3/year), 2012—2016

	2012	**2013**	**2014**	**2015**	**2016**
PW*	130 909 973	127 833 805	141 006 271	148 181 942	138 101 839
DPW**	31 491 555	32 227 733	33 230 953	33 830 308	30 510 835
IPW***	32 756 572	37 292 502	39 360 701	42 479 952	43 421 496
Total	195 158 100	197 354 040	213 597 925	224 492 202	212 034 170

*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 3b: Number of installations with discharges failing to meet the 30 mg oil/l performance standard, valid from 2007 onwards, and quantity of oil discharged by these installations (in tonnes)

	2012	2013	2014	2015	2016
Number of installations exceeding 30 mg/l	4	3	4	4	5
Quantity of dispersed oil discharged	3,0	3,3	10,5	3,1	18,8

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), 2012—2016

2012	2013	2014	2015	2016
Total OPF	Total OPF	Total OPF	Total OPF	Total OPF
0	0	0	2460	0

Table 4b: Number of wells drilled with OPF, with discharge of contaminated cuttings to the maritime area, 2012—2016

2012		2013		2014		2015		2016	
OBF	non-OBF OPF	OBF	non-OBF OPF	OBF	non-OBF OPF	OBF	non-OBF OPF	OBF	non-OBF OPF
0	0	0		0	0	4	0	0	0

Table 5: Spillage of oil and chemicals

Table 5a: Number of oil spills, 2012—2016 - Spills less than 1 m³ (≤ 1 m³) and spills above 1 m³ (> 1 m³)

2012		2013		2014		2015		2016	
<=1 m3	> 1 m3	<=1 m3	> 1 m3	<=1 m3	> 1 m3	<=1 m3	> 1 m3	<=1 m3	> 1 m3
118	4	112	5	60	8	41	6	36	3

Table 5b: Total quantity of oil spilled, in m³, 2012—2016

2012		2013		2014		2015		2016	
<=1 m3	> 1 m3	<=1 m3	> 1 m3	<=1 m3	> 1 m3	<=1 m3	> 1 m3	<=1 m3	> 1 m3
7,0	9,0	6,2	34,0	9,4	134,0	6,0	34,0	1,58	15,1

Table 5a: Number of chemical spills, 2012—2016 - Spills less than 1 m³ (≤ 1 m³) and spills above 1 m³ (> 1 m³)

2012		2013		2014		2015		2016	
<=1 m3	> 1 m3	<=1 m3	> 1 m3	<=1 m3	> 1 m3	<=1 m3	> 1 m3	<=1 m3	> 1 m3
110	38	126	31	203	19	130	43	138	25

Table 5b: Total quantity of chemical spilled, in m³, 2012—2016

2012		2013		2014		2015		2016	
<=1 m3	> 1 m3	<=1 m3	> 1 m3	<=1 m3	> 1 m3	<=1 m3	> 1 m3	<=1 m3	> 1 m3
15	350	18	1 267	22	736	16	1 563	18,81	313,48

Table 6: Emissions to air, 2012—2016

CO_2 (in million of tonnes)

2012	2013	2014	2015	2016
12,44	11,57	12,06	13,85	13,34

NOx (in thousands of tonnes)

2012	2013	2014	2015	2016
50,4	50,5	51,8	46,8	44,71

nmVOC (in thousands of tonnes)

2012	2013	2014	2015	2016
33,0	32,8	48,2	47,3	42,50

CH_4 (in thousands of tonnes)

2012	2013	2014	2015	2016
25,7	23,5	28,3	29,1	19,47

SO_2 (in tonnes)

2012	2013	2014	2015	2016
822	914	862	736	584,23

Table 7: The use and discharge of offshore chemicals, 2012—2016

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

Prescreening category	2012	2013	2014	2015	2016
PLONOR	282 848 186	346 516 261	322 304 630	311 861 617	283 520 496
Inorganic LC50 or EC50 >1 mg/l	-	-	-	-	-
Ranking	82 880 656	204 629 459	194 465 840	104 211 550	111 064 657
List of Chemicals for Priority Action	3	6		-	0
Inorganic LC50 or EC50 <1 mg/l	30	92	120	49 672	134 810
Biodegradation < 20%	1 287 072	1 636 733	1 820 950	2 330 299	2 397 250
Substance meet two of three criteria	1 506 167	1 326 315	1 351 210	1 410 717	1 040 438

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

Prescreening category	2012	2013	2014	2015	2016
PLONOR	104 495 858	114 256 578	107 667 490	94 071 979	89 022 868
Inorganic LC50 or EC50 >1 mg/l	-	-	-	-	-
Ranking	13 532 911	52 507 255	59 137 480	14 417 695	14 231 540
List of Chemicals for Priority Action	3	6		-	0
Inorganic LC50 or EC50 <1 mg/l	21	-	30	43 684	74 639
Biodegradation < 20%	3 600	2 957	5 220	14 083	20 316
Substance meet two of three criteria	5 018	3 399	9 040	15 868	11 087

Table 7c: Chemicals spilled in kg per year

Prescreening category	2012	2013	2014	2015	2016

PLONOR	159 000	233 000	567 470	540 664	230 887
Inorganic LC50 or EC50 >1 mg/l	-	-	-	-	-
Ranking	10 060	38 600	173 242	301 398	112 954
List of Chemicals for Priority Action	-	-		8	-
Inorganic LC50 or EC50 <1 mg/l	69	-	360	N/A	186
Biodegradation < 20%	900	130	2 960	7 806	1 398
Substance meet two of three criteria	82	160	2 780	5 432	1 440

Table 8: Norway total production in oil equilvalents (millions of tonnes)

2012	2013	2014	2015	2016
170,55	161,57	161,36	178,38	184,47

OSPAR COMMISSION

Victoria House
37-63 Southampton Row
London WC1B 4DA
United Kingdom

t: +44 (0)20 7430 5200
f: +44 (0)20 7242 3737
e: secretariat@ospar.org
www.ospar.org

OSPAR's vision is of a clean, healthy and biologically diverse North-East Atlantic used sustainably

ISBN: 978-1-911458-59-3

Publication Number: 719/2018