

Risk-Based Approach to the Management of Produced Water Discharges from Offshore Installations



Policy Issue: The development of a risk-based approach to assess the environmental risk posed by produced water discharges, resulting in the identification, prioritisation and adoption of risk reducing measures

Policy Objective: Reduce the input of oil and other substances into the sea resulting from produced water discharges from offshore installations, with the ultimate aim of eliminating pollution from those sources

© Sebastian Unger

Background

Produced water is generated in oil and/or gas production operations and includes formation water, condensation water and re-produced injection water. It also includes water used for desalting oil. Produced water may be discharged following treatment.

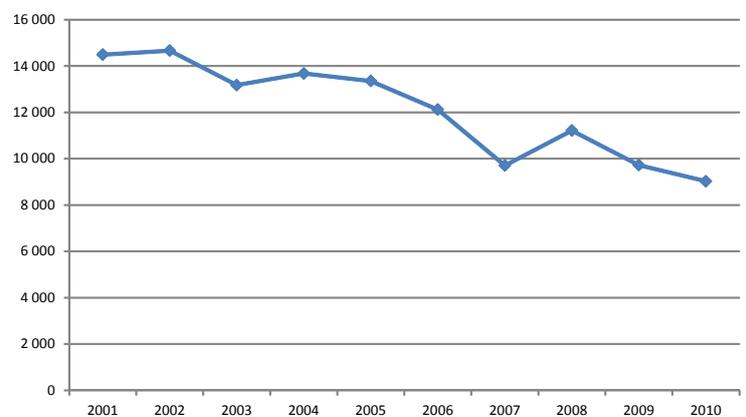
OSPAR Recommendation 2001/1 focuses on oil in produced water (see Figure 1) and the application of Best Available Technique (BAT) and Best Environmental Practice (BEP), but discharges of produced water contain other substances, such as heavy metals, aromatic hydrocarbons, and alkyl phenols which are present in the hydrocarbon reservoir, and added chemicals that are used during the production and produced water treatment processes. There was therefore a need to move forward towards a more holistic approach and in 2012 OSPAR adopted a Recommendation for a Risk-based Approach to the Management of Produced Water Discharges from Offshore Installations (RBA Recommendation) and associated Guidelines. The risk-based approach is a method of prioritising mitigation actions on those discharges and substances that pose the greatest risk to the environment.

What is our main goal?

OSPAR is committed to taking all possible steps to prevent and eliminate pollution from offshore sources and in particular to achieve a reduction in discharges of hazardous substances via produced water, by making every endeavour to move towards the target of cessation of discharges of hazardous substances by the year 2020, with the ultimate aim of achieving concentrations in the marine environment near background values for naturally occurring substances and close to zero for man-made synthetic substances.

The objective is that by 2020 all offshore installations with produced water discharges in the OSPAR maritime area will have been assessed to determine the level of the risk and that, where appropriate, measures will have been taken to reduce the risk posed by the most hazardous substances.

Figure 1. Oil discharged in displacement and produced water (T)



What has been done so far?

OSPAR has adopted a wide range of programmes and measures to reduce pollution from all phases of offshore oil and gas activities. These include measures to reduce the amount of oil discharged in produced water (OSPAR Recommendation 2001/1) and measures to control the use and discharges of offshore chemicals (OSPAR Harmonised Mandatory Control System).



Risk-Based Approach to the Management of Produced Water Discharges from Offshore Installations



Oil discharges to the marine environment in produced water have fallen by approximately 20% in the OSPAR maritime area since 2000, as shown in Figure 1. This has been achieved mainly through injection of produced water and the introduction of new water treatment technology. The discharge of hazardous chemicals has also decreased by 50% between 2005 and 2009.

Where are we now?

The RBA Recommendation and its associated Guidelines were adopted at the OSPAR Commission meeting in 2012. All Contracting Parties will finalise their implementation plans in 2013, with the aim of achieving full implementation by 31 December 2018.

Starting in 2014, Contracting Parties will report annually on progress during the implementation period, through the OSPAR Offshore Industry Committee, and the Committee will undertake an evaluation of the effectiveness of the risk-based approach every five years after 2008.

What happens next?

All substances present in the produced water will contribute to the total risk. The risk-based approach will determine the magnitude of the total risk and, where appropriate, which substance or group of substances contributes most to the total risk, and whether exposure levels in the receiving environment relating to the discharge, or specific components of the discharge, indicate that the risk is adequately controlled, so that Contracting Parties can take the most effective risk reduction management measures.

The risk will be characterised on the basis of a combination of Whole Effluent Assessment (WEA) studies and/or an assessment of the individual substances or groups of substances, identified in the produced water, taking account of the exposure relating to the discharge and the sensitivity of the receiving marine environment.

If the risk is not considered to be acceptable, appropriate measures based on BAT and BEP will be required to be implemented by industry to avoid or minimise the risk. This approach will be implemented for all offshore installations with produced water discharges in the OSPAR maritime area.

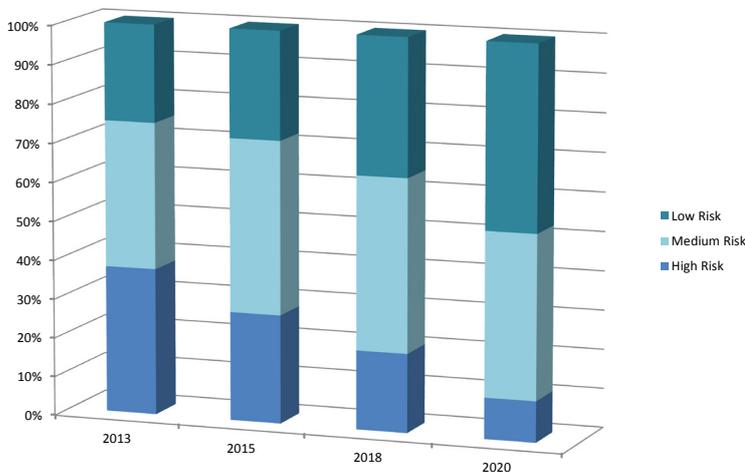


Figure 2: Theoretical illustration of how the implementation of a risk-based approach would be expected to result in changes in the proportions of low, medium and high risk components of discharges. The illustration does not relate to the current proportions of the components, and is not a forecast of anticipated changes in the proportions between 2013 and 2020 or the size of residual risk in 2020.



© Sebastian Unger

Challenges ahead

As produced water composition varies from installation to installation, so do the associated risks to the environment. As a result, future challenges will emerge in reducing uncertainty and increasing comparability. In addition, as experience with implementing the RBA is gained, procedures for risk evaluation and impact assessment need to be improved. Standardisation of the evaluation and assessment criteria that will trigger measures would improve the comparability and harmonise procedures. In combination with precautionary action to minimise risks through the available technical options, the aim will be to strengthen protection standards.

Sources of information:

OSPAR 2001/1 Recommendation for the Management of Produced Water, as amended:
http://www.ospar.org/documents/dbase/decreecs/recommendations/01-01e_consol%20Produced%20water.doc
 OSPAR Recommendation for a RBA to the Management of Produced Water Discharges:
http://www.ospar.org/documents/dbase/decreecs/recommendations/12-05e_RBA%20Recommendation.doc