Utilizing Whole Effluent Testing in an Intelligent Testing Strategy for Offshore Produced Water Discharges

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Abstract:

The RBA framework has since 2010 been the management tool for offshore oil and gas installations in the North Atlantic. Two approaches are used for evaluating the produced water (PW) ecotoxicity in the RBA framework: Whole Effluent Testing (WET) and Substance Based (SB). Currently, the SB approach is the cornerstone for defining the hazard, however the data availability is often not sufficient to accurately apply this approach. The insufficiencies are both related to incomplete characterization of the complex chemical composition but also related to ecotoxicological assessment of already known chemical constituents, especially production chemicals. As an alternative we suggest using a tiered approach utilizing the WET as a first tier to identify the potential hazard of a discharge. By doing so the hazard assessment and following risk characterization is not limited by incomplete chemical characterization as the WET inherently include all constituents present in the discharge thus limiting the associated uncertainties. A second tier include a Toxicity Identification Evaluation (TIE) to identify the drivers of toxicity through simple physical and chemical treatments of the effluent. Additionally, this method would allow for a simple identification of the potential decrease in toxicity different fractions e.g. volatile or particulate. Combining the dilution requirements from the WET approach with the decrease in toxicity from the different fractions identified through the TIE it would be possible to identify which fractions would require treatment to reach a defined threshold of a “no harmful discharge”. If the above tiers are not able to identify means of sufficiently decreasing the toxicity of the effluent a more in-depth chemical analysis should be carried out to identify substances of concern to further assist decisions on treatment efforts.

The presentation will demonstrate the proposed tiered approach using experimental data from four different PW discharges from installations in the North Sea.