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Publication date:
2023

Document Version
Publisher's PDF, also known as Version of record

Link back to DTU Orbit

Citation (APA):
Ferreira, A. R., Chhetri, R. K., Ntynez, A. G. B., Feilberg, K., Hedegaard, L., Jakobsen, A., Mandrupsen, M. N., Birkebæk, T., Hørning, P., & Andersen, H. R. (2023). *Produced water treatment on the seabed: startup of pilot-scale biofilm reactor*. Abstract from Danish Offshore Technology Conference 2023 , Kolding, Denmark.

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Danish Offshore Technology Centre
Technology Conference 2023

Produced water treatment on the seabed: startup of pilot-scale biofilm reactor

*Ana Rita Ferreira[1], Ravi K Chhetri[1], Alexandros G B Ntynez[1], Karen Feilberg[2], Liselotte Hedegaard[3], Arne Jakobsen[3], Morten N. Mandrupsen[3], Tommy Birkebæk[3], Peter Hørning[3], Henrik R Andersen[1]**

[1] Department of Environmental and Resource Engineering. Water Technology & Processes. Technical University of Denmark, Bygningstorvet 115, 2800 Kgs. Lyngby, Denmark

[2] Danish Offshore Technology Centre Laboratory for Off-Shore Production Sciences. Elektrovej, 375, 2800 Kgs. Lyngby, Denmark

[3] Copenhagen School of Marine Engineering and Technology Management (Maskinmesterskolen København). Gyrithe Lemches Vej 20, 2800 Kongens Lyngby

* presenter

Produced water (PW) treatment before discharge into the environment will prevent pollution of marine ecosystems. Biofilm reactor has proved feasible to reduce up to 80% of the organic compounds present in four different offshore PW samples from the North Sea. Organic compounds and relative concentrations before and after treatment were analyzed. The initial concentration of compounds like PAH, alkanes, alcohols, alkenes substantially decreased comparing to the initial sample.

The PW temperature (40 °C) and the harsh conditions on the seabed such as several fold increase of oxygen saturation concentration has shown to be an advantage for biofilm reactor operation improving treatment efficiency. Therefore, these operational conditions also have a positive impact on reactor footprint since decreases the occupation of space by 13 fold when comparing with land installations. A pilot reactor with 1 m^3 capacity was designed and is currently under construction. The reactor will be filled with MUTAG BioChip™ and work with identical operational conditions. It will be soon tested in shallow water with wastewater from Danish Oil Pipe A/S's at the harbor in Fredericia facilities aiming to prove that the design can work on the seabed close by oil production platforms.