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Extraction of critical raw material as a method to reduce the impact on reservoir permeability and the North Sea ecosystem

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In this work, a method for extracting lithium carbonate from various samples of produced water by chemical precipitation is proposed. Additionally, the "treated" produced water was used to determine its impact on reservoir rock properties and relative damage. One potential solution to reduce the volume of produced water and its environmental impact is the reinjection of the produced water back into the reservoirs. However, observations based on past experiences with Danish wells located in the North Sea have shown a rapid decline in injectivity (within a few months) following the reinjection of produced water. The main issues of injectivity reduction and reservoir damage are most pronounced near the wellbore. This is primarily due to the precipitation of various minerals, which leads to decreased permeability. Finally, through the lithium precipitation method, this significant change in the composition of produced water greatly reduces the overall metal load in the marine environment. As a result, an environmental model based on USEtox was developed for a comparative analysis of changes in ecotoxicity.



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