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Sustainable Innovation in Decommissioning: Subsurface Storage of Gravel in the Offshore Area of the Ceará Basin

Helson Neres, Luis Glauber Rodrigues (Universidade Federal do Ceará), Karen Leopoldino Oliveira (Federal University of Ceará), Walter Francisco Cardoso Junior, Miguel Rodrigo Cavalcante de Moraes, Francisco Lucas Damascena Silva (Universidade Federal do Ceará), Levy Kevin Valério Teobaldo

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Introduction

Given the energy transition scenario and the complexity associated with the decommissioning of mature fields—especially when revitalization is no longer economically viable—it is pertinent to explore new ways of using these environments, focusing on solutions that promote environmental balance and industrial sustainability, such as CO₂ and H₂ storage or the storage of drilling cuttings.

The injection of waste into subsurface formations through tubular wells is already a well-established practice worldwide in the oil industry. This solution has proven to be technically effective, environmentally sound, and economically more attractive compared to other disposal alternatives.

This work is part of a broader project whose main objective is to define the ideal location and investigate the capacity of reservoirs for the reinjection of drilling cuttings, combining hydraulic fracturing with geological, geophysical, and geomechanical analyses of reservoirs in mature fields. This initial stage focuses on the Curimã field.

Method and/or Theory

The methodology includes, in its initial stages, a systematic review of the literature on the subject, geological modeling of the reservoir, and analysis of well data. Next, geomechanical analysis and reservoir flow simulation are employed. Public data provided by the ANP is used, covering geological and geophysical information on the Curimã field, allowing for consistent integration between the different aspects of the study.

Results and Conclusions

A table is being developed with the main characteristics of reservoirs used worldwide for gravel injection, including parameters such as permeability, porosity, and depth, which will allow for the construction of an overview of the geological conditions favorable to this application. In addition, the proposed methodology will contribute to the prediction of disposal capacity in selected fields, while detailed geological analysis will assist in identifying the most suitable reservoirs for gravel injection. This knowledge makes a concrete contribution to the energy transition by offering environmentally responsible solutions for drilling waste management.