

DESIGN AND EVALUATION OF SHAPE MEMORY POLYMERS COMPOSITE (SMPC) TO CONTROL LOST CIRCULATION OF WATER-BASED MUD

MINEX CRC PROGRAM 1

Drilling Technologies

PHD PROJECT

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RESEARCH PROJECT

Lost circulation of drilling fluid is one of the challenges of drilling oil and gas wells that increases the non-productive time and total cost. Use of Lost Circulation Materials (LCM) is a common method to control fluid loss. However, even with the advances and development in the latest years, LCMs still have lots of limitations such as failing to seal complex large fractures and causing plugging of the drill string. In this proposal, we will evaluate the effect of a novel Shape Memory Polymer Composite (SMPC) on blocking large fractures to control lost circulation. This is an innovative technique because of SMPC's excellent mechanical and physical properties.

Furthermore, by changing the formulation, it is possible to manufacture composites with more desirable properties. Sealing fracture efficiency of SMPCs will be investigated using Permeability Plugging Tester (PPT).

Finally, the results will be compared with selected conventional LCMs. The physical and mechanical properties of SMPS will be investigated based on standard tests. The morphological structure of SMPS will be studied by Scanning Electronic Microscopy (SEM).

The outcome from this study not only will be an applicable material to mud lost control, but also can be used to improve wellbore integrity.