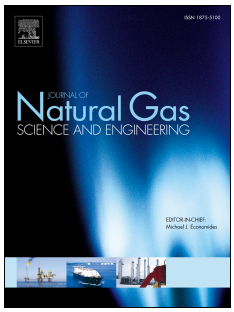
Accepted Manuscript



Promoting wellbore stability in active shale formations by water-based muds: A case study in Pabdeh shale, Southwestern Iran

Mohammadamin Albooyeh, Iman Rahimzadeh Kivi, Mohammadjavad Ameri

PII: S1875-5100(18)30240-3

DOI: 10.1016/j.jngse.2018.05.040

Reference: JNGSE 2598

To appear in: *Journal of Natural Gas Science and Engineering*

Received Date: 4 February 2018

Revised Date: 22 May 2018

Accepted Date: 31 May 2018

Please cite this article as: Albooyeh, M., Rahimzadeh Kivi, I., Ameri, M., Promoting wellbore stability in active shale formations by water-based muds: A case study in Pabdeh shale, Southwestern Iran, *Journal of Natural Gas Science & Engineering* (2018), doi: 10.1016/j.jngse.2018.05.040.

Promoting wellbore stability in active shale formations by water-based muds: A case study in Pabdeh shale, Southwestern Iran

[a]Mohammadamin Albooyeh, [b]Iman Rahimzadeh Kivi, [c]Mohammadjavad Ameri

[a] National Iranian Drilling Company, Ahwaz, Iran. Email address: amin.albooyeh@gmail.com

[b] Department of Petroleum Engineering, Amirkabir University of Technology, Tehran, Iran. **Corresponding author**, Email address: iman.rahimzadeh@aut.ac.ir

[c] Department of Petroleum Engineering, Amirkabir University of Technology, Tehran, Iran. Email address: ameri@aut.ac.ir

Abstract

Minimizing water invasion into shales is a critical property for many water-based muds. By improving drilling fluids rheology in HPHT conditions, it is possible to minimize water invasion and maintain true overbalance pressure conditions at near wellbore scale which endorses wellbore stability. In order to propose an inhibitive mud formulation for drilling troublesome swelling Pabdeh formation frequently encountered in southern to southwestern regions of Iran, a comprehensive experimental approach was adopted. After performing rheology and thermal stability tests for 81 different formulations of drilling fluids, 5 high performance salt/polymer solution muds were chosen. They showed good rheology properties and all of them were thermally stable. In order to find the best formulation which accomplishes all requirements pertaining shale stability and wellbore integrity, some complementary analyses were performed. Using a roller oven simulating down hole temperature conditions, physical integrities of shale samples immersed and rolled in these 5 mud formulations were investigated. Pore pressure transmission tests were also carried out using a membrane efficiency screening equipment to evaluate membrane efficiency of the Pabdeh shale and also inhibitive performances of 5 designed mud formulations. Accordingly, pore pressure evolution in shale samples in contact with designed muds were obtained by direct measurements, which resembles the near wellbore pore pressure alterations. According to the obtained results, Pabdeh shale shows negligible membrane efficiency of about 4%. Although all mud formulations show high surface coating capabilities resulting in almost high shale recovery after exposure, pore pressure transmission