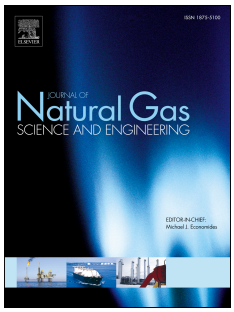
Accepted Manuscript



A Cylindrical Model for Hydrate Dissociation Near Wellbore During Drilling Operations

Saeed M. Golmohammadi, Ali Nakhaee

PII: S1875-5100(15)30236-5

DOI: 10.1016/j.jngse.2015.10.032

Reference: JNGSE 1086

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

Received Date: 19 August 2015

Revised Date: 21 October 2015

Accepted Date: 23 October 2015

Please cite this article as: Golmohammadi, S.M., Nakhaee, A., A Cylindrical Model for Hydrate Dissociation Near Wellbore During Drilling Operations, *Journal of Natural Gas Science & Engineering* (2015), doi: 10.1016/j.jngse.2015.10.032.

A Cylindrical Model for Hydrate Dissociation Near Wellbore During Drilling Operations

Saeed M. Golmohammadi[a], Ali Nakhaee[a,b]

[a]Department of Petroleum Engineering, Kish International Campus, University of Tehran
[b]Institute of Petroleum Engineering, College of Engineering, University of Tehran
sgolmohammadi@ut.ac.ir//anakhaee@ut.ac.ir

Abstract

The growing demand for energy in recent decades has resulted in a quest for alternative resources. Naturally-occurring gas hydrate formations are suggested as the new sources of hydrocarbon energy. During drilling through hydrate-bearing formations, it is vital to predict and control hydrate dissociation behavior. The uncontrolled dissociation of hydrate formations could be hazardous to the reservoir integrity, wellbore equipment, and even the drilling rig. This research aims at a better understanding of interrelation of wellbore parameters and hydrate-bearing formations to improve the safety of drilling operations as well as to maintain the integrity of the reservoir. To address these concerns, a three dimensional numerical model has been developed to simulate the hydrate dissociation behavior in the porous medium of the reservoir during drilling operations. With the aid of this model, the effects of wellbore pressure and temperature on the dissociation pressure and temperature, velocity and location of dissociation front, and the rate of produced and released gas to the wellbore have been studied intensively.

Key-words: Natural Gas Hydrate; Drilling; Hydrate Dissociation; Finite Difference Method; Simulation.