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FINAL MS DEFENSE

PETROLEUM ENGINEERING

"Phase and Volumetric Behavior of CO_2 and Bakken Oil System under Reservoir Conditions"

Abstract

The Bakken Petroleum System (BPS) is one of the largest unconventional petroleum and natural gas resource and the most prolific tight oil plays in the North America. Either secondary recovery or enhanced oil recovery (EOR) is required because of the unsatisfying recovery factor in the primary recovery stage. CO_2 based EOR process is the most favorable method for Bakken reservoirs due to reservoir natural properties. In consequence, it is important to quantify and investigate parameters such as CO_2 solubility and oil swelling factor of this hydrocarbon system. In this thesis, a series of experiments are performed to extend the phase behavior database for CO_2 and the Bakken crude oil. In the phase behavior experiment, equilibrium parameters such as CO_2 solubility, oil swelling factor, extraction pressure, and the pressure that leads to a zero swelling factor are determined. With the data acquired from the experiment, the equation of state (EOS) model can be obtained for further simulation studies. In addition, the mechanism of CO_2 EOR method, especially at real reservoir conditions, can be comprehensively investigated and analyzed by the visualization of interactions between CO_2 and oil during the entire experiment process.

Date:

Friday, Dec 11th, 2020

Time:

Starts @ 1:00PM

Zoom Meeting Details:

HYPERLINK

Meeting ID: 954 4174 2458

Password: 340426

Committee Chair:

Assistant Professor Xiaoli (Laura) Li