

THESIS INFORMATION

PhD student name: **NGUYEN VAN TUAN** Course: **2013**
Major: **Applied Petroleum Engineering** Code: **62.52.06.04**
Dissertation Title: **Assessment The Effect of Formation Water on Production Efficiency in Su Tu Den Fractured Basement Reservoir**

Scientific Advisor: **1. Associate Professor, Doctor: Tran Van Xuan**
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DISSERTATION SUMMARY

In Viet Nam, most of the oil production has come from fractured basement reservoirs in which Su Tu Den fractured basement reservoir (STD) was discovered in 2000 and now is the largest and the main producing reservoir of block 15-1, Cuu Long basin.

The STD basement reservoir began production in 2003 with seven wells. In the first few months of production, the oil was being produced under natural depletion with the initial designed production rate of 65,000 bopd, water injection started a year later to maintain reservoir pressure. After a short time of water injection, water break through was observed in many adjacent wells that caused oil production dropped significantly. As a result, many adjustments and controls were implemented in the field to secure production and control water cut, e.g. choke back the well whenever water cut is higher than a certain level, adjusting production and water injection rates downwards in an attempt to reduce water cut. However, water cut had continued to increase, field production continued to drop sharply and that all ever became a major concern for reservoir management.

In this dissertation, author introduces methodologies to determine the sources of produced water and to early identify the existence of water aquifers, proposes comprehensive methods to evaluate its contribution, to assess its impacts on production and water injection efficiency, aiming to optimize, timely adjusting production regime and future development strategy for this particular STD fractured basement reservoir, provide development conceptual design for new similar discoveries.

NEW CONTRIBUTIONS / RESULTS OF THE DISSERTATION

The research results of the thesis have the following contributions:

- 1- For the first time the author has proposed comprehensive methods to early identify the existence and contribution of formation water, built a aquifer model for fractured STD basement reservoir.
- 2- For the first time the author has evaluated the impacts of formation water on production efficiencies and water injection urgency of STD fractured basement reservoir.
- 3- Proposed comprehensive production strategies when water break through, applied updated technology for production and injection well completion design for water flooded reservoirs, established development design concepts for new similar discoveries.
- 4- The study results have contributed methodologies in designing and producing oil in water drive fractured basement reservoirs.

SIGNIFICANCE OF SCIENCE AND PRACTICE

In this dissertation, base on studied and calculation results it has described comprehensive methods to early identify the sources of produced water and its impacts on production and injection for STD fractured basement reservoir.

Evaluated the contributions and impacts of formation water to the production and water injection efficiency, simulated injection sensitive studies to determine the urgency of

water injection (Number of injection wells, volume of water injection, injection time) for this kind of reservoir.

Proposed practical solutions for producing and developing water drive fractured basement reservoirs.

Research results have proved true not only for production in STD fractured basement reservoir but also for recent Su Tu Vang, Su Tu Nau fractured basement reservoirs and will possibly be applied for new similar reservoirs in the Block.

The thesis has shed light into the studies of formation water, the origin of aquifers and its locations, proposed secondary and tertiary production strategies for future development for the remaining and methods to develop new field efficiently.

Scientific Advisors

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