INVESTIGATION OF THE pH VARIATION DUE TO INTERACTIONS OF SUPERCRITICAL CO_2 + BRINE + SAND IN A PRESSURES REPRESENTATIVE OF AQUIFERS

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This report is submitted in partial fulfillment of the requirements needed for the award of Bachelor in Engineering (Hons) Oil and Gas

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JULY 2013

ACKNOWLEDGEMENT

First and foremost, I would like to express my gratitude to Allah for His blessings that give me patience and made possible to finish this Final Year Project 1.

Secondly, I would like to thank the supervisor of this project, Mr. Erfan Mohammadian for his valuable guidance and encouragement. His willingness to guide and motivate me has brought successful to my project.

Besides, million thanks to the Coordinator of Final Year Project, Ms. Nur Hashimah binti Alias for her priceless support. Also, I would like to take this opportunity to express appreciation to the Faculty of Chemical Engineering especially to all lecturers for their encouragement.

Last but not least, I would like to thank my family and friends for their supports throughout the progress of this project.

ABSTRACT

The purpose of this study is to study the sequestration of CO_2 in deep saline aquifers. The means to sequestrate the CO_2 in deep saline aquifers is a way to mitigate the emission of greenhouse gases that cause the nowadays global warming. The specific objectives of this study is to investigate the effect of the pH variations at various temperatures, to investigate the effect of brine salinity on pH of the solution at various reaction times and to measure the pH of the solution at variable reaction times. The experiment is carried out in controlled lab in UiTM Shah Alam and using the specially designed rig setup that consists of equipment such as reactor and analytical devices. The maximum operating pressure and temperature for this experiment are 200 atm and 250℃ respectively. The results of this study were then analysed using X-Ray Fluorescent (XRF).

Keyword – sequestration, brine, pH, aquifer.

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CHAPTER 1

INTRODUCTION

1. INTRODUCTION

1.1 Background Study

'Environment versus needs' is the most debated topic nowadays. Considered dull, yet there are thousands of reasons to justify why this debate should not be ignored. Ironically, to light a household would sacrifice a little freshness of world's atmosphere. The emission of greenhouse gases especially carbon dioxide (CO_2) proved to hurt the atmosphere. The CO_2 contributed the highest amount, about 64% of the total greenhouse effects alongside with other greenhouse gases (Bachu, 2000). There are plenty of efforts have been executed to reduce the emission of this gas, in order to pamper the world's environment.

One of them is to store the unwanted CO_2 in a place isolated from our environment; which also termed as *sequestration.* For the time being, deep saline aquifers are the best candidate for sequestration site; due to its largest potential in volume for CO_2 storage in geological media (Bachu, 2000). It has been estimated that world aquifers could provide a storage capacity of up to 1×11^{13} tonnes of CO_2 which is enough to store several hundred years of the world's CO_2 emission (Piri, 2006). The biggest challenge to exploit this advantage is that the costly procedures to make it happen; the necessary structures such as pipelines, injection wells and other surface equipment (Li, 2005).