SCREENING AND ASSESSING THE CO_2 STORAGE POTENTIAL OF CO_2-EOR IN ONSHORE OIL FIELDS IN LOUISIANA.

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ABSTRACT

CO_2 is a greenhouse gas that is suspected to cause global warming when released to the atmosphere. It is produced primarily as a result of burning of fossil fuels. The world consumes a vast amount of energy on a regular basis, with fossil fuels accounting for 80% of that energy. Therefore, it is necessary to reduce CO_2 emissions. CO_2 enhanced oil recovery (CO_2-EOR) is a form of carbon storage that has the potential to minimize CO_2 emissions while also increasing energy output from newly recovered oil. Louisiana is the 5th largest emitter of energy-related CO_2 in the United States, with about 200 million metric tonnes of CO_2 emitted annually. Louisiana has over 20,000 oil and gas reservoirs and 287 CO_2 point sources. Because of the large number of concentrated sinks and sources, industrial CCUS and CO_2-EOR projects have a lot of potential. This study used a screening methodology at the reservoir level to identify appropriate CO_2-EOR candidate reservoirs in Louisiana and their CO_2-EOR reserve estimates. In addition, an economic analysis of CO_2-EOR was carried out in this thesis, which included sensitivity and scenario analysis. In Louisiana, this study identified 217 reservoirs across 86 oil fields as potential CO_2-EOR candidates. According to the Louisiana assessment, the 217 candidate reservoirs have a total of 1.4 billion STB of OOIP and a 205 million STB incremental oil potential worth $12.3 billion. The CO_2 storage capacity of these reservoirs is projected to be 100 million metric tons. There are several other suitable candidate reservoirs in Louisiana with cumulative oil production less than 1MMSTB that were not taken into account in this analysis. When combined with the reservoirs described in this thesis, the incremental oil recovered potential and CO_2 reservoir storage capacity will reach 1.5 billion STB and 2.6 billion metric tons, respectively. In Haynesville, Bayou Segnette, and Paradis, economic evaluations were conducted for suitable CO_2-EOR candidate reservoirs. The sensitivity studies revealed that the net income and economic viability of a CO_2-EOR project are highly dependent on oil price, CO_2 cost, and tax policy. CO_2-EOR would benefit greatly from the high oil price, low CO_2 cost, and low tax policy. Lastly, because of the large CO_2 reservoir storage capacity and large amount of CO_2 emissions from industrial point sources, CO_2-EOR in Louisiana has a lot of potential. Given the current economic situation, the economic analysis indicates that operating successful CO_2-EOR projects would be difficult. However, the study also shows that CO_2-EOR projects can be made economically feasible by combining 1. tax reductions/exemptions in areas such as royalties, income tax, and severance tax. 2. negotiating lower CO_2 prices 3. Increase in tax credit for capturing facilities in order to lower CO_2 prices for storage parties.

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