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Techno- economical studies of a CCS-EOR project for Iranian oil reservoir

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The main purpose of this study was to screen various Enhanced Oil Recovery (EOR) technologies for a number of selected matured reservoirs and perform a feasibility investigation of using Carbon Capture and Sequestration (CCS) technology by miscible CO₂ injection. The candidate hydrocarbon reservoirs were simulated to compare the EOR methods and also evaluate economically the aspects of CCS-EOR. This study has been done by assessing the production results such as oil recovery as well as gas-oil ratio accompanied with economic parameters. In this work, lab experiments have been performed on reservoir core sample based on an incremental pressure algorithm approaching the miscible conditions to monitor the miscible CO₂-EOR injection and also validate the Minimum Miscibility Pressure (MMP) value obtained by slim-tube apparatus. Lab-scale simulation has been used to estimate the field operational parameters for CO₂-EOR processes. Based on the field scale simulation, comparison among different gas injection methods (N₂, CH₄, and CO₂) has been done to find the best technical processes. An economic model was constructed to assess the required costs of CO₂ capturing, transportation, compression and injection. Capturing cost was evaluated using the current technologies from power plants, refineries and gas processing plants. A techno-economic analysis was performed on the CCS-EOR methods to evaluate their Net Present Value (NPV). The results obtained showed that the CO₂-EOR method is the best selected EOR method for higher oil recovery and lower gas production. Additionally, the economic evaluation (NPV analysis) showed that the use of miscible CO₂ injection in the candidate reservoirs was more economical compared to the other scenarios. By reducing Green House Gas (GHG) emission to the atmosphere, the CCS- EOR method has a great potential in reducing the causes of global warming.

Biography

Mohammad Parvazdavani obtained his BS degree in Mining Engineering from Isfahan University of Technology, Iran (IUT) in 2009 and his MS degree in Petroleum Engineering from Sharif University of Technology (SUT) in 2011. Currently, he is PhD candidate of Petroleum University of Technology in common with Sharif University of Technology. He works in Research Institute of Petroleum Industry related to NIOC (National Iranian Oil Company) and his field of interest is EOR study.

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