

Abstract

Global oil production has been declining for the last few years for several reasons. Oil field's maturity is one of these. Enhanced Oil Recovery (EOR) is a promising technique to increase oil production and has been practiced all over the world. Bangladesh has also experienced similar difficulties. Haripur Oil Field is the only oil field in the history of Bangladesh that went to production for almost seven years. Since July 1994, oil production has been suspended there. In this project on Haripur oil field we plan to conduct an economic feasibility study of enhanced oil recovery (EOR) with CO₂ application. First step of this study is to determine oil originally in place (OOIP), expected ultimate recovery (EUR) and remaining oil reserve (ROR). Second step is to calculate the required amount of CO₂ for this project and the cumulative cost for the injection of that amount of CO₂. On the third step, the cumulative profit from oil is compared with the cumulative cost of CO₂ injection. OOIP, EUR and ROR are calculated using software FEKETE, F.A.S.T. R.T.A package. Oil production data is collected from Sylhet Gas Fields Ltd. through Petrobangla. For calculating the cost of EOR, several established rules of thumb have been used from different EOR projects practically practiced worldwide. From our calculation, we find that the average value of Oil originally in place (OOIP) is 9882.25 Mbbls. With the conventional method, the expected ultimate recovery (EUR with a 21% recovery factor) is 2075.25 Mbbls and the remaining recoverable reserve (ROR) is 1506.283 Mbbls. If EOR technique is applied, (with a 40% recovery factor) EUR becomes 3952.9 Mbbls, while ROR is 3392.031 Mbbls with an increment of 1885.75 recoverable remaining oil reserve. Again, the cumulative amount of CO₂ needed for this project has been calculated as 1,458,573 tons (with new CO₂ only) with the cumulative cost of this EOR project to be \$98071345 (including both the primary and the secondary cost) with an injection price of \$65/ton of CO₂ and \$5/ton of recycled CO₂. The cumulative profit from extracted oil is calculated to be approximately \$101,760,930 with a price of \$30/barrel of oil. The project is assumed to have an economic life of 30 years. CO₂ needed for this project is planned to be supplied from two natural gas driven power stations established within a radius of 25 km and 50 km respectively. Finally, a sensitivity analysis is conducted to show the variation of break-even points of this project for any variation in different variables.