



Development Plan and Economical Evaluation for Sirte Basin Oil Field

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Introduction

After the application of conventional oil extraction techniques, about 2/3 of discovered reserves still remain to be produced, In view of high probability for oil presence and oil price increases, investments in research of possibilities for higher recoveries and higher production with application of appropriate IOR and EOR methods are justified, naturally under economic conditions.

The objective of this study is to increase the oil reserve and to decrease the decline production rate of Sirte Basin Oil Field by control the oil production rate of the existing wells and study the effects of different improved oil recovery methods and show the production forecasting over fifteen-years from 2016 to 2031, including base case (Existing wells) and development cases by using black oil reservoir simulator.

Theory and Method

In this study, a sector model Sirte Basin Oil Field has been matched with the historical production data by adjust the petrophysical properties in the near well bore region, after that the model was developed by examining different IOR methods to improve the oil recovery in this area which are Infill Well Drilling method and Water Flooding method and then all of these methods have been evaluated economically.

reservoir simulation software was used to Predict the performance of different IOR methods that were studied to develop the field and to determine the suitable IOR method(s) for this reservoir.

Results and Conclusions

- Generally all methods focused on increasing oil recovery for this field.
- The decline production rate was decreased by controlling (decreasing) the oil production rate for the existing wells and the plateau period was extended.
- The recovery factor of the field by using Infill wells was about 45% and it was the highest recovery factor between all cases by additional reserve about 15,00,000 STB while the lowest oil recovery was about 28% and it was as result of base case which represents the Existing wells only without any development "no action"

- Economic evaluation have been done for all cases and the highest CUM NCF was as result of infill wells drilling case with cumulative net cash flow 2.4 MMMUS\$ and payout time less than one year and for the base case the CNCF was 1.4 MMMUS\$ and it was the lowest CNCF
- The recovery factor of using water flood method was about 39% and the CNCF for this method was 2 MMMUS\$.

The future prediction over fifteen-years of the production showed that the most suitable IOR method which provided the highest oil recovery was Infill Well Drilling case while the lowest amount of incremental oil production was as result of using base case and water flood case and due to the high production rate from this field and the water that have been injected in the reservoir caused early breakthrough where the oil remained behind the water.

water flood case and base case are not recommended for this area because they produced the lowest RF and cum NCF and also due to early breakthrough of the water.

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