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How to Increase the Value of a Highly Volatile Oil Reservoir in a Developed Gas Market Environment

The Tisza-1 reservoir is situated at the top of the SE part of Algyő field, Hungary. The 1700 m depth reservoir has been developed in the uppermost sandstone series showing good reservoir quality. The well sorted, middle and coarse grain sandstone contains extra light crude: the reservoir volume factor is near 4.0 res.bbl/bbl and the oil quality is 63 API. The extreme characteristics of the reservoir oil mean that the intermediate content is above 34 mol%. The production started as early as 1986. The 17 years exploitation history has proved, the strong bottom water drive as primary driving mechanism. By the end of 2001 a 33% of oil recovery was reached and the reservoir pressure drop was 8.3 bars with average water cut of about 27%. Control logs have indicated that about 35% of the net pay pore volume has been unaffected by the bottom water. The main aim of the reservoir management was to increase the recovery of mid-components and to sweep the oil from the upper zones by using dry gases. A 3-D, compositional simulation model was developed to evaluate the potential of the gas injection. The static model has been up-scaled to flow units corresponding to the interconnected reservoir rock bodies of identical depositional environment. Comparing the production forecast cases the gas injection showed an additional 11% of mid-component recovery. During the modeling different gases were investigated to use. The economical evaluation was highly affected by the developed gas market environment but finally the lean gas was chosen for injection purpose. The gas injection project started in 2000 after a 4 year planning and preparation. This case study summarizes the planning, preparation of the gas injection project, highlights the dilemmas of the economics and shows the latest results of the process.