

Barenburg EOR Pilot: From Theory to Practice

T. Vielhauer, J. Plenge, F. Fazeli

ExxonMobil Production Deutschland GmbH, Hannover, Germany

A project's execution poses a very different set of challenges in comparison to its planning. Conducting Enhanced Oil Recovery (EOR) in the declining Barenburg oil field with aging facilities was no exception, in that although planned to the last details, there were still many surprises faced and lessons learned in the course of performing the polymer-flood project.

Fields and wells often react uniquely to the introduced recovery methods and although reservoir simulations provide a strong basis for judgement on the Where and the How, they still fall short to predict all possible outcomes. Additionally, even though manufacturers generally claim to provide flawless material and equipment, reliability could still only be put to test once a system is actually up and running.

In the case of the polymer-flooding project in Barenburg, the pilot patterns managed to successfully prove not only an uplift in production, but also the viability of the pilot to remain operational over the years to come. Still, maintaining these increased production rates was a complex task, particularly due to the reservoir voidage replacement imbalances and the influence of other injectors and producers in the area. Moreover, reaching the equipment optimal operating point, enquiry of services that deliver reliable results (e.g. well rate measurement) as well as optimizing the delivery, handling and maintenance activities introduced many complications along the way, often hindering the success of the project itself.

The key to resolving the challenges above and maintaining a successful production to date, in the absence of fancy state-of-the-art technologies, has been to develop a strong surveillance plan and learning from hands-on experiences of the operators. Continuous individual measurement campaigns have generated and updated reliable data, based upon which the state of the project was constantly evaluated in the team. This includes reliable measurement and regular analysis of injection and production rates, pressures, polymer and fluid compositions etc. Furthermore, communicating issues and brainstorming easy-to-implement solutions led to reducing downtime and eliminating such instances in the future.

With a strong focus on economic viability in this stage of a field's life, keeping the costs down while maintaining a high productivity is only possible through structured data gathering and analysis as well as the dedication and resilience of the team members.