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Practical implementation of the life cycle from IOR to EOR using the example of current cases

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Abstract:

Most Enhanced Oil Recovery (EOR) applications are based on knowledge gained during the phase of Improved Oil Recovery (IOR). Implementation of EOR projects are in general very challenging but without having experience from an IOR phase the magnitude of challenge increases significantly. In most cases, the already achieved recovery factors of a field are a consequence of already implemented IOR measures, which achieved in most cases recovery factors beyond 20% before any EOR measure is even being seriously screened.

The lack of subsurface, facility and operations spanning knowledge and appropriate prediction tools will limit the ability of any operating company to execute a suitable uncertainty and risk analysis for a selected field. In general limitations in subsurface knowledge can be improved by data acquisition, data analytics and by applying new technology driven solutions like elastic cloud simulation of multi realization models. However, despite these tools operator knowledge is one of the strongest tools to create a business case and understand associated risks of any EOR application.

If such knowledge is missing, a proper way forward is to establish a suitable team, define the data acquisition campaign, mandatory lab work, data analytics, the feasibility of a pilot project and highlight all likely uncertainties and risks associated to each stage of the project. A focus must be on a staged project maturation with an appropriate risking and transparency in terms of likely costs of failure (CoF) with a fit for purpose quality assurance and quality control.

The development and execution of a pilot is essential in order to calibrate the expectations gained from the subsurface modeling with actual dynamic field results and based on that optimize the EOR concept. A pilot will also allow the operations team to gain experience in operating an injection scheme in accordance with companies HSE requirements. The pilot will deliver additional critical information like what is limiting injection, achievable injection pressures and volumes, impact on microscopic and macroscopic sweep efficiency, impact on pressure depletion and if tracer injection is selected even the chance to calibrate the actual flow path of injected fluids.

At the example of numerous fields where IOR measures were implemented and further evolved it will be proved that EOR is the logical next step operators identified respectively already applied in order to increase recovery from the fields. It shows what supports and what harms the implementation of EOR. A brief insight into a holistic workflow covering maturation of an EOR project will be demonstrated and why CoF is important. Furthermore a fully anonymized example of work related to an existing field in Romania will be shown in order to demonstrate how work in a holistic team looks like.

Biography:

Christian Jespersen is Development Project Manager in OMV Petrom Upstream. He worked for DEA AG on technical and management level supporting numerous international IOR and EOR projects with focus on increasing recovery from offshore fields in the North Sea, Egypt and Mexico. Christian is member of SPE and DGMK. In OMV Petrom, he is leading the work to mature a full stage IOR/EOR project for a highly pressure depleted field.