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Integration of Noise and Temperature Logging Outcomes into Reservoir Simulation

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ABSTRACT

The surveillance of production and injection performance on well and reservoir levels is fundamental to good reservoir management of water floods and miscible floods. In multilayer reservoirs the actual reservoir flow behaviour depends upon multiple factors such as formation permeability, formation pressure for each zone, fracture system development, horizontal reservoir properties continuity, connectivity between flowing zones, effective flowing thickness, etc. These parameters should be incorporated into the reservoir simulation in order to replicate actual reservoir behaviour, obtain robust history match, and increase predictability of the model.

ADCO has undertaken a pilot IOR project in one of the giant onshore fields in Abu Dhabi with peripheral water injection and gas injection in the crest. An innovative reservoir surveillance program was designed and applied in the field to identify fluid flow behind pipe, detect gas or water breakthrough, and aim at understanding fluid flow behaviour and sweep process.

Micro-Grid Flow Modelling (MGFM) is a fine-grid reservoir flow simulation technique. It involves calibration of reservoir properties and production / injection flow profiles against acquired data. It also involves re-allocation of production / injection volumes based on the temperature and noise logging and the knowledge derived from observations such as behind casing flow communications. MGFM was applied to this project by incorporation of the results of the production surveillance campaign into the fine-grid simulation sector model.

This paper describes main outcome from the well production, noise and temperature logging, and its integration into reservoir simulation. It illustrates advantages of production / injection flow profile calibration to a sector model for better history match[A1] ing. This integration leads to increased accuracy of the dynamic model with better understanding of the sweep process across sub-units.

[A1]I do not follow this.