

Intelligent tracers identify water breakthrough

Operator changes reservoir management strategy

Challenge

An operator wanted to determine the location of water breakthrough in a complex subsea field development without intervention or major modifications to the existing completion design.

Solution

RESMAN intelligent tracers (RES•H2O) with uniquely identifiable signatures were installed in three subsea producers.

Application

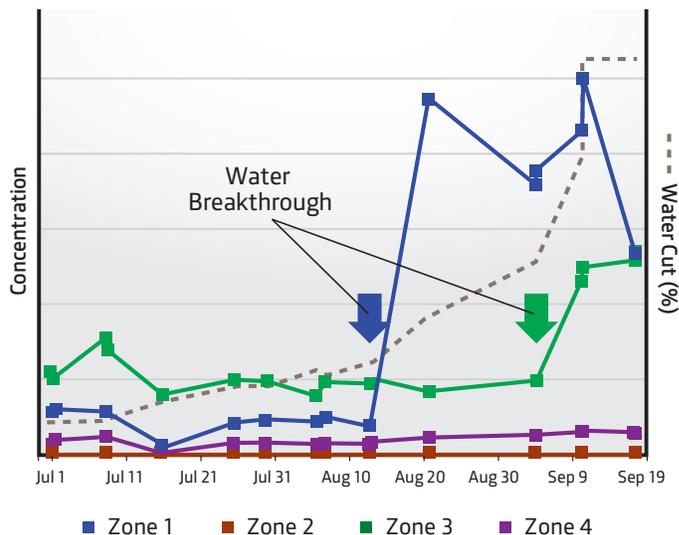
RES•H2O systems were integrated into the existing completion screens of the producing intervals from the three wells. Each well had four zones and commingled their production to a facility located two miles from the wells.

The completion was run in hole without deviations from normal procedures, with no additional rig time or extra personnel at site.

The intelligent tracers remained dormant until two years after well completion, when a rapid increase in water cut was noticed at the production facility. The water breakthrough events activated the release of only the specific RES•H2O signatures that were installed in the affected zones.

Analysis of production fluid samples revealed two independent water breakthrough events in one of the subsea wells (Fig. 1). The first event corresponded to an increased concentration of the RES•H2O signature installed in zone 1 of the affected well. Approximately 20 days later, the analysis identified a second water breakthrough event in zone 3 of the same well.

Fig. 1 - Water influx detected in zones 1 (blue arrow) and 3 (green arrow) of the affected four-zone well.



Results

Based on the water breakthrough findings, the reservoir team adjusted the reservoir models and improved the management of the field-wide water flood program. This included adjustments to injector well rates and placement of future wells.

RESMAN's solution provided an excellent fit to this application because the RES•H2O systems were adaptable to the existing sand screens and are long-term, very low risk and cost-effective.

Following the successful results of this campaign, the operator installed RES•H2O systems in every new producer well of this subsea development.

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