

RESMAN Tracer systems identify water breakthrough

Operator changes the reservoir management strategy

Challenge

An operator wanted to determine the water movement in the reservoir layers to further optimize their oilfield water flood program. This was a complex subsea field development and the operator wanted to extract the water movement information without intervention or major modifications to the existing completion design.

Solution

Three of the oil production wells in the field were long horizontals, each in contact with multiple reservoir layers. Knowing the timing of water breakthrough from these layers was essential to understand the water movement. RESMAN water-activated tracer systems, RES•H₂O, were distributed into the wells for this purpose.

Application

The RES•H₂O systems were integrated into the existing completion screens of the producing intervals. Each well had four zones and

commingled to the production facility, located two miles from the wells. Two years after completion, a rapid increase in water cut was noticed at the production facility. This event activated RES•H₂O signatures. Fig. 1 shows tracer signatures from one of the subsea wells, revealing two independent water breakthrough events: The first event corresponded to an increased RES•H₂O signal from zone 1, and 20 days later, the analysis identified a second water breakthrough in zone 3 of the same well.

Results

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

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

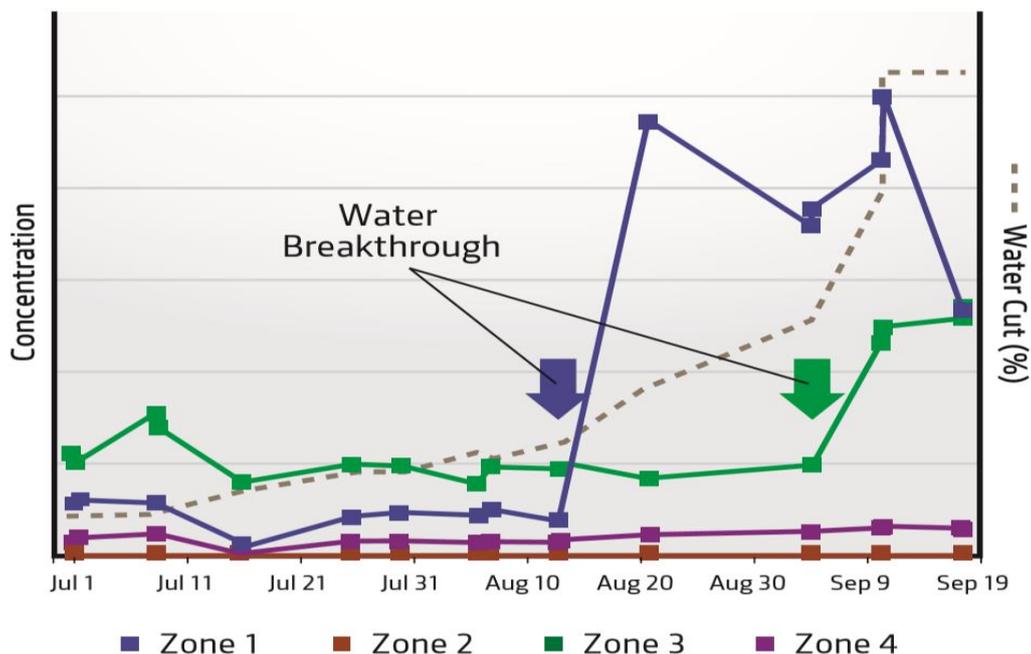


Fig. 1 – Water influx detected in zones 1 (blue arrow) and 3 (green arrow) of the affected four-zone well

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