

# Intelligent tracers quantify zonal inflow contribution

## Operator optimizes completion design

### Challenge

An operator wanted to determine the inflow contribution from five reservoir intervals of a horizontal subsea well without intervention operations or modifications to the existing completion design.

The well had a five-mile tie back to an FPSO and commingled production with several subsea production wells from the same field.

### Solution

RESMAN intelligent tracers (RES•OIL) were installed in each of the five reservoir compartments of the subsea well. Proprietary inflow models developed by RESMAN were used to quantify the inflow from each interval.

### Application

The RES•OIL systems were integrated under the wire wrap of screens that also contained inflow control devices (ICDs), as shown in Fig. 1. The completion was run in hole without deviating from normal procedures and without additional rig time or extra personnel at the site.

Production was shut in for 24 hours, and the well was restarted. Production fluid samples were taken at the surface to be analyzed and the results modeled.

RESMAN used its patented Flush Out model to quantitatively measure the amount of inflow from each zone. Each square in Fig. 2 shows the tracer concentration of the unique RES•OIL system installed in each of the five zones. The solid lines represent the Flush Out model\* fit for each data set.

\* Refer to Technical Bulletin 2 for more information about RESMAN's Flush Out model and flow loop verification of model accuracy.

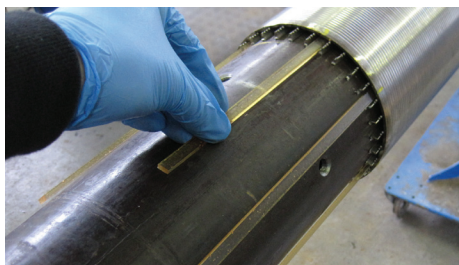


Fig. 1 - RESMAN intelligent tracers are easily integrated into the screens, eliminating design complexity and operational risk

Fig. 2 - RES•OIL concentration (squares) vs. produced volume and Flush Out model fit (solid lines) during transient flow

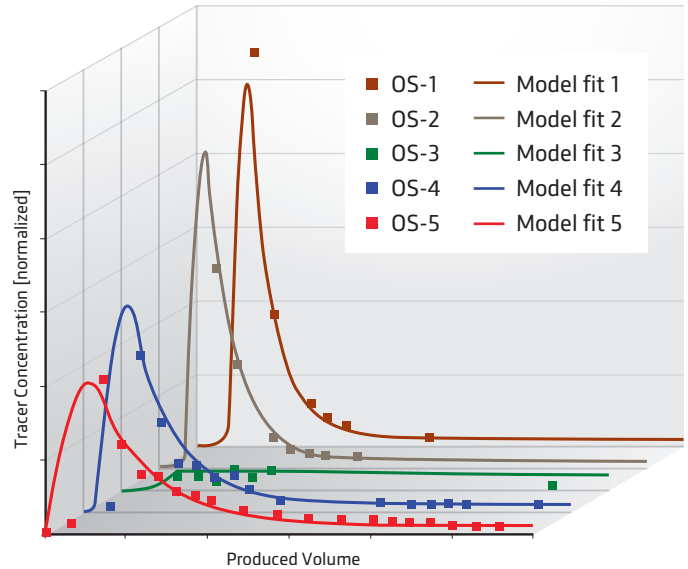


Fig. 3 - Inflow distribution per reservoir compartment

Zone	Relative inflow contribution
OS-1 (toe)	38%
OS-2	34%
OS-3	1%
OS-4	6%
OS-5 (heel)	21%

### Results

The inflow distribution calculated for each reservoir compartment revealed that more than 70% of the production originated from the toe of the well, while the middle of the well displayed very poor performance (Fig. 3).

By using RESMAN, the operator gained valuable understanding about zonal inflow contribution, which will enable better well placement and optimization of ICD settings for future well designs.

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