

# Intelligent tracers provide inflow assurance

## Operator confirms completion integrity and zonal performance

### Challenge

An operator had three surveillance challenges in a subsea well: (1) confirm flow control valve functionality; (2) ensure packer sealing integrity; and (3) determine the relative inflow performance of the two monitored intervals. The well was approximately 18,000 feet deep and had a two-mile tie back to the production facility.

### Solution

RESMAN intelligent tracers (RES•OIL) with uniquely identifiable signatures were installed in two reservoir compartments of the three-zone subsea well (Fig. 1).

### Application

The RES•OIL systems were installed in purpose-built carriers that hold the tracer material on the outside of the production tubing. The carriers were run in the well without deviating from normal procedures and without additional rig time or extra personnel at the site.

The well was initially produced from a lower zone (zone 3) that was not controlled by a smart valve. Zones 1 and 2 were controlled by smart valves that were closed for several hours. As Fig. 2 shows, no intelligent tracer molecules were present in the flow, thereby providing assurance the flow control valves and packers were performing as intended.

The smart valve in Zone 2 was opened while the smart valve in Zone 1 remained closed. Analysis of intelligent tracer concentration revealed that: (a) the smart valve in Zone 2 successfully opened; (b) the mechanical packer between zones 1 and 2 continued to provide isolation; and (c) the smart valve in zone 1 functioned properly and provided a seal.

Subsequently, the smart valve in Zone 1 was opened. Analysis of intelligent tracer concentration showed that the valve opened successfully.

RESMAN also used its patented Flush Out model\* to determine the relative inflow performance between the two zones installed with intelligent tracers. Zone 1 presented a response that indicated its inflow rate was 70% more than Zone 2.

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

Fig. 1 - Completion schematics illustrating the RES•OIL systems installed in zone 1 and zone 2

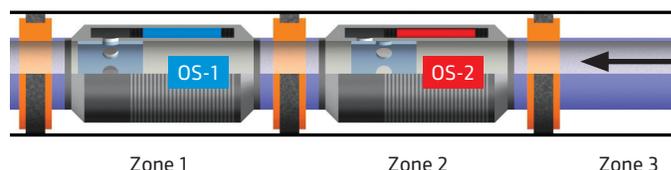
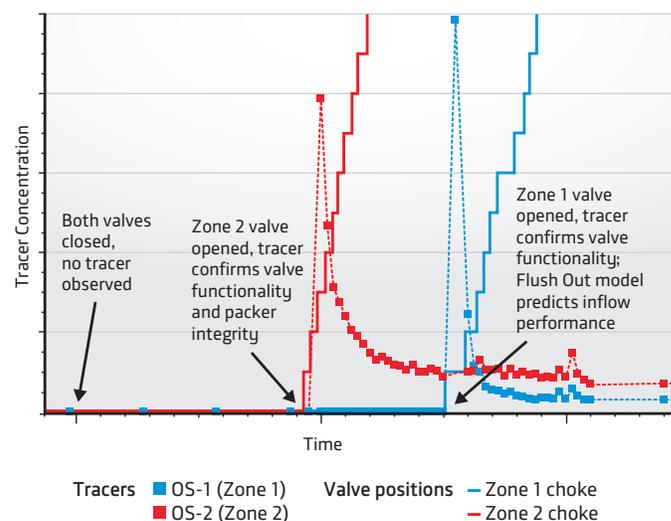


Fig. 2 - Intelligent tracer analysis results



### Results

By using RESMAN, the operator was able to confirm the successful operation of the flow control valves and sealing integrity of the packers. In addition, quantitative analysis revealed that Zone 1 was a significantly better producer than Zone 2.

Because RESMAN intelligent tracer systems have an operating life of several years, they can be used periodically to confirm the integrity of completion equipment and to recalculate zonal inflow contribution without intervention into the well.

DON'T JUST MANAGE YOUR WELL. RESMANAGE IT.

HQ +47 916 71 333 • Norway/EU +47 917 36 519 • UK/Africa +44 7717 34 61 56 • Russia/CIS +7 916 083 1548  
M. East +971 50 924 9933 • Far East/Asia +60 12241 2056 • L. America +55 21 97916 3565 • N. America +1 713 550 7216  
info@resman.no • www.resman.no

**RESMAN**<sup>®</sup>  
WIRELESS RESERVOIR SURVEILLANCE