# Renaissance® Capillary System

## Restores Production in Sour Gas Well, Saves 80% Over Cost of Conventional Workover

### Objectives

- Restore production in a sour gas well that was shut in when a plugged chemical-injection line prevented dissolution of produced sulfur.
- Devise an alternative to heavy workover operations for replacing a safety valve and chemical injection line without pulling the completion tubing.

### Our Approach

- Weatherford engineers met with the operator to investigate options for replacing a safety valve, control line and injection line. They devised a plan for Weatherford crews to retrieve existing components from the well, then modify and install a Weatherford capillary system (WCS) combination safety valve. The WCS chemical injection line would carry solvent to the perforations while also controlling the safety valve. The Weatherford experts recommended Renaissance system components to provide a custom solution and avoid a costly workover.
- The Weatherford team deployed to the wellsite and retrieved existing safety valve and injection system components.
- WCS components were modified to withstand the high $H_2S$ content from the outside as well as the corrosive inhibition fluid from the inside. A combination of INCOLOY® Alloy 925 and FFKM perfluoroelastomers met the customer's criteria for compliance with NACE MR0175 production standards for $H_2S$ environments.
- Different sizes of injection line were modelled using expected pump pressures to achieve required liquid volumes. This led to selection of a 3/8-in. × 0.065-in. line made of Alloy 825, which is resistant to corrosive environments.
- The Weatherford team installed the new WCS system without a rig, using a slickline and mini-coil unit. All function- and pressure-tests were performed to full customer satisfaction.
- The well was brought online and production resumed at the same rate attained before the well was shut in during 2016. Permanent injection was established at required rates and expected pressure.

### Value to Customer

- Use of Renaissance technology to replace the existing valve with the new WCS combination valve and chemical-injection accessories facilitated a rigless installation into the existing completion string.
- Total budget for the installation was only 20% of the cost of standard operations, which would have required a workover rig for replacement of the completion string and associated equipment.
- With no workover rig, fewer personnel were needed at the wellsite, thus reducing exposure to risks associated with wellsite operations.

Weatherford Renaissance systems enable retrofitting of capillary systems and other components without need for a workover rig.

**LOCATION**
Lower Saxony, Germany

**WELL TYPE**
Onshore Well

**PRODUCTION**
Sour gas
- 12% $H_2S$
- 7.5% $CO_2$

**DEPTH**
13,123 ft (4,000 m)

**PRODUCTS/SERVICES**
Renaissance WCS-System :
- Control-line hanger
- WCS stinger assembly
- WCS combination safety valve
- Siphon sub with CCI injection valve
- Well-control safety sub
- CV-1 dual check valve with weight bar

Weatherford®