

ForeSite Sense® Reservoir Monitoring Solution

Informs Reservoir Strategy with Real-Time Flow Data, Saves \$10M in CAPEX and \$1.5M Annually in OPEX

Objectives

- Provide real-time downhole flow, pressure, and temperature data in a water-alternating-gas (WAG) injection well. The operator of a mature oil and gas field plans to inject water or gas selectively into different formations and needs accurate downhole data to determine optimal injection rates.

Our Approach

- After a thorough pre-job analysis, a Weatherford reservoir monitoring team recommended ForeSite Sense flowmeters along with quartz pressure/temperature (P/T) sensors. The only optical downhole flowmeter in the world, the ForeSite Sense flowmeter contains no downhole electronics, moving parts, or nuclear sources, and is rated to 320°F (160°C) and 14,504 psi (1,000 bar), which can withstand the bottomhole temperature swings down to 60°F (15°C) during water injection.
- At the platform, Weatherford crews deployed three ForeSite Sense flowmeters as part of the production string during the well completion. The crew placed a ForeSite Sense quartz P/T gauge below each flowmeter and ran a fiber-optic cable to interrogate all devices continuously.
- The ForeSite Sense systems are delivering precise downhole data for monitoring reservoir performance, with measurements at various choke positions showing excellent agreement between surface injection rates and downhole measured rates. These measurements eliminate the need for wireline logging runs that only provide infrequent snapshots in time.

Value to Customer

- ForeSite Sense reservoir monitoring provides real-time zonal flow rates and P/T measurements, which the operator used to refine reservoir management strategies in a dynamic environment. This degree of reservoir management would require at least one additional well and a costly wireline-logging program that could provide only intermittent downhole data. By avoiding these expenses, the operator saved an estimated \$10 million in CAPEX, and saved \$1.5 million in annual OPEX.



The ForeSite Sense flowmeter delivers real-time flow rates, which the operator uses to refine reservoir management strategies under changing conditions.

LOCATION

Norwegian North Sea

WELL TYPE

Water-alternating-gas injector

PRODUCING FORMATIONS

Statfjord, Dunlin, and Brent Group Sandstones

CASING SIZE

9-5/8 in., 47 lb/ft

LINER SIZE

7 in.

FLOWMETER SETTING DEPTHS

- 8,402 ft (2,561 m)
- 10,295 ft (3,138 m)
- 10,958 ft (3,340 m)

BOTTOMHOLE TEMPERATURE

257°F (125°C)

PRODUCTS/SERVICES

ForeSite Sense flowmeter
ForeSite Sense quartz P/T gauge

