Schlumberger

WellWatcher Ultra ASE

Accurate single-ended DTS acquisition system

APPLICATIONS

- Heavy oil thermal recovery monitoring
- Wells requiring distributed temperature measurements
- Wells with degraded optical fiber

BENEFITS

- Longer fiber logging and increased system life due to improved interrogation
- Control of production rates and drawdown
- Reduction of system costs through reduced fiber length
- Long-term, reliable, permanent in-well reservoir monitoring
- Enhanced recovery and production management through improved reservoir surveillance
- Fast identification of production problems through best-in-class temperature measurements
- Simplified completion designs
- Continuous production allocation
- Minimized service interventions

FEATURES

- Multiple laser interrogation
- Dynamic fiber loss correction along every meter of fiber for every acquired temperature profile
- Compatibility with WellWatcher BriteBlue* multimode DTS fiber, for maximum system life
- No downhole electronics
- Simple-to-use surface software with auto setup and optimization
- Range of up to 3.73 mi [6 km]

In harsh environments, such as thermal recovery and high-pressure, high-temperature applications, measuring from only one end of a fiber can lead to a deterioration in accuracy when the fiber begins showing signs of hydrogen degradation.

The WellWatcher Ultra ASE system is designed for challenging field conditions. It incorporates rugged design, portability, and ease of use for field personnel.

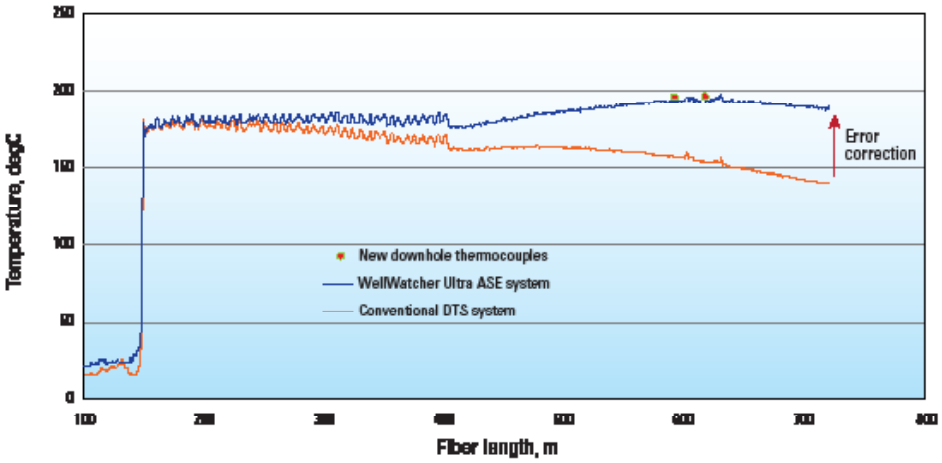
The extremely versatile WellWatcher Ultra ASE* accurate single-ended DTS acquisition system dynamically corrects for such fiber loss along the entire length of the sensing multimode fiber. This system provides an accurate single-ended fiber-loss-corrected temperature profile for reservoir monitoring. It measures up to 3.73 mi [6 km] of fiber at a meter's resolution, updates data in just a few seconds, and interrogates numerous fibers from one surface system. As a result, the WellWatcher Ultra ASE system lasts longer and allows simplified completion designs, compared with standard DTS systems.

The data obtained is available as soon as the measurement is taken. It is communicated via various industry-standard protocols or those customized by Schlumberger's engineering team to the specifics of a particular installation. The data is combinable with data obtained by other Schlumberger sensors, and a support team is available to help derive the best solution from the data to allow operators to make key decisions with confidence.

Acquisition results

The WellWatcher Ultra ASE acquisition system can revitalize wells in which the optical fiber has degraded. Accurate temperature profiles can be obtained without the expense of fiber replacement.

To enhance system life in the harshest wellbore conditions, a custom-designed fiber-optic solution can be obtained by combining the system with WellWatcher BriteBlue multimode DTS fiber.



The graph shows distributed temperature measurements in a typical heavy-oil thermal recovery well. The surface fiber connects to the wellhead at 150 m, after which the fiber goes downhole, carried by a control line clamped to the completion. The temperature variation at 400 m indicates a change in the wellbore fluid level. The conventional DTS system temperature plot is affected by fiber degradation, and a temperature error is induced. The WellWatcher Ultra ASE system, on the other hand, accounts for this degradation; the graph clearly shows how the system has corrected for an error of >45 degC.

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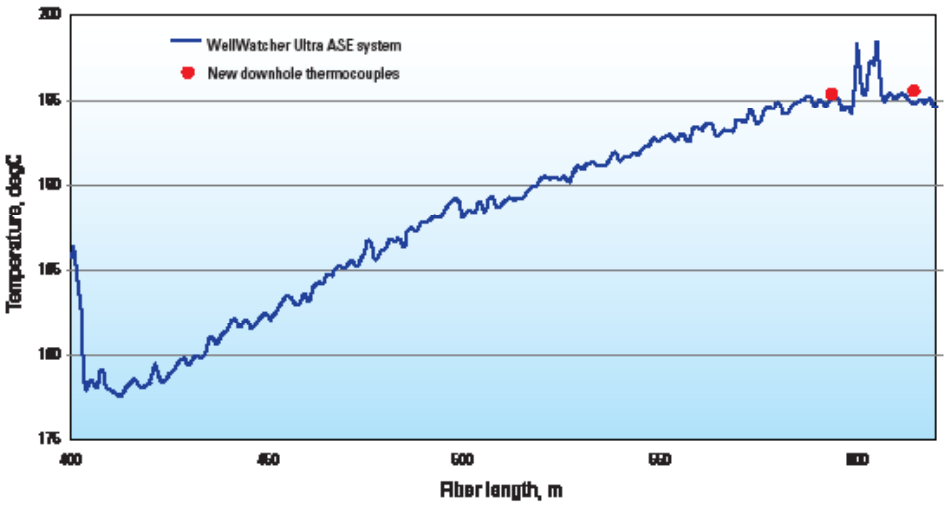
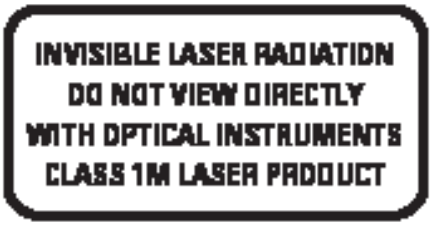


This temperature profile, acquired with the WellWatcher Ultra ASE DTS system, shows that after the system corrected for the error induced from a degraded fiber, its measurements agreed with two independent reference points obtained from newly installed downhole thermocouples.

WellWatcher Ultra ASE System Specifications	
Range, mi, [km]	3.73 [6]
Spatial resolution, ft [m]	3.28–6.56 [1–2]
Sample interval, ft [m]	1.64–3.28 [0.5–1]
Temperature accuracy, degF [degC]	±7.2 [±4] at 0–3.7 mi [0–6 km] on Schlumberger fibers
Number of loops or fibers	12 single-ended
Fiber type	50 um, multimode
DTS physical dimensions	3U 19-in, rack mounted or mobile
Operating temperature, degF [degC]	32 to 104 [0 to 40]
Storage temperature, degF [degC]	–67 to 167 [–55 to 75]
Relative humidity, %	5–85 (noncondensing)
Power	AC, 90–253 V (optional DC, 24 V); typical steady state: 50 W; maximum: 150 W
DTS communications	
DTS to PC	Ethernet 10/100/1,000 Base T
DTS to Modbus PLC	Ethernet 10/100/1,000 Base T
Laser classification	Class 1; (IEC/EN 60825-1 [2014])



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