

FIBER OPTIONS: PRODUCTION PROFILING

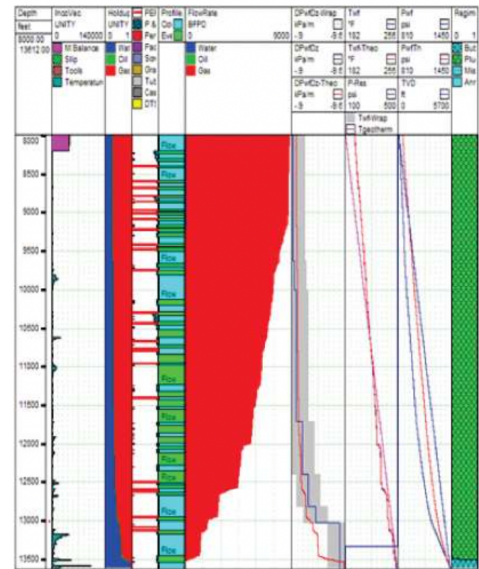
Fiber optics provides continuous acquisition of distributed temperature throughout the entire wellbore without utilizing downhole electronics. This is accomplished with state-of-the-art laser technology pulsed through the fiber positioned along the full length of the well or area of interest. The instantaneous acquisition of temperature provides the operator with a profile of dynamic production over time, allowing the modelling of reservoir behaviour and analyzing zonal production.

Production Profiling Application:

- Fiber optic production profiling can be performed with the flow inside or outside of tubing or casing
- May be used for zonal contribution, leak detection or mechanical failures
- Analysis can be performed on single or dual-phase profiling
- Able to identify cross flow in multi-zonal completions
- Detect flood water breakthrough
- Identify unproductive intervals for remedial action
- Comparative analysis for frac performance
- Define a high-resolution geothermal gradient prior to initial completions

Benefits:

- Wells do not require extended shut-in periods
- Eliminates the need for multiple passes
- Does not need intimate contact with production flow, eliminating the need to pull tubing as with conventional logging
- Can be deployed by multiple conveyance methods
- Long-term monitoring allows for complete field optimization
- Small operational footprint
- High-resolution temperature (0.1°C)



	Standard Coil	High Temp. Coil	Slickline	E-Line
OD	1 1/2"	1 1/2"	1/8"	1/4"
Length	3,500 m	2,500 m	5,000 m	7,500 m
Temperature	200°C	300°C	200°C	200°C
Temp. Resolution	0.1°C	0.1°C	0.1°C	0.1°C
Pressure	72 MPa	72MPa	103 MPa	103 MPa
Resolution	0.5 m	0.5 m	0.5 m	0.5 m
Sample Rate	30 sec	30 sec	30 sec	30 sec
H₂S / CO₂	yes / yes	yes / yes	yes / yes	no / no
Hz Deployment	Coil	Coil	Pump Down	Tractor, Pump Down