

FlairFlex

Advanced real-time fluid logging and analysis service

FlairFlex service

FlairFlex* advanced real-time fluid logging and analysis service provides early insight into reservoir fluid properties and composition through at-surface quantification of C_1 – C_6 and qualification of C_7 – C_8 .

Applications

- Formation evaluation and reservoir characterization in all well and reservoir types
- Interwell and intrawell fluid-facies mapping
- Optimization of completion programs
- Input for geosteering and well placement decisions
- Conventional and unconventional plays



The FlairFlex service integrates two fluid extraction units: one at the inbound drilling fluid line and the other at the outbound line.

Benefits

- Optimizes formation testing, sampling, and downhole fluid analysis
- Characterizes reservoir fluid independently of drilling fluid, wellbore geometry, temperature, and pressure
- Provides zero-operational-risk formation evaluation
- Reduces rig time and cost

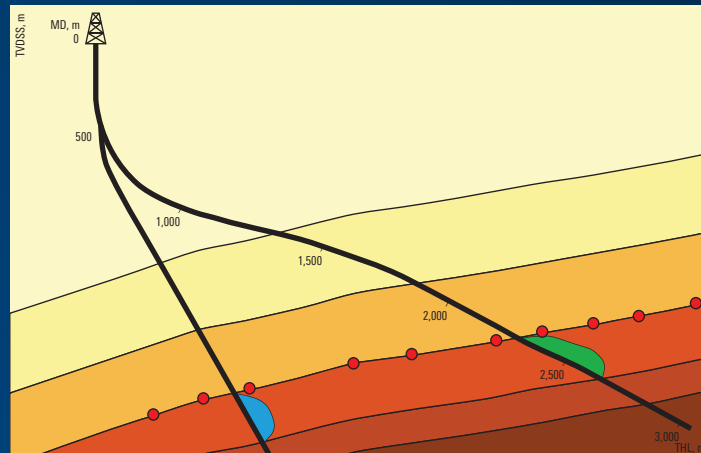
Features

- PVT-analogous hydrocarbon composition log for C_1 – C_6
- Measurement of C_7 – C_8 compounds, light aromatics, cyclic, and nonhydrocarbons such as carbon dioxide, helium, and hydrogen
- Proprietary calibration of extractor efficiency and correction from recycling and contamination
- Fluid type and GOR prediction
- Built-in QC workflows
- Integration with other formation evaluation data sources

Earlier Insight from At-Surface Formation Evaluation

Get downhole data at surface

By extracting hydrocarbons from drilling fluid returns at surface, the FlairFlex service provides fluid characterization and early insight into C_1 – C_6 reservoir fluid composition before downhole sampling or well testing is possible. This unique wellsite service provides vital information regardless of logging conditions and does so with zero additional operational risk.



The FlairFlex service quantified fluid composition in real time, and the results were later verified by PVT analysis.

Make informed investment decisions

In exploration and appraisal campaigns, investment decisions often must be made with limited data. The FlairFlex service provides the first available formation evaluation information to improve crucial infrastructure planning.

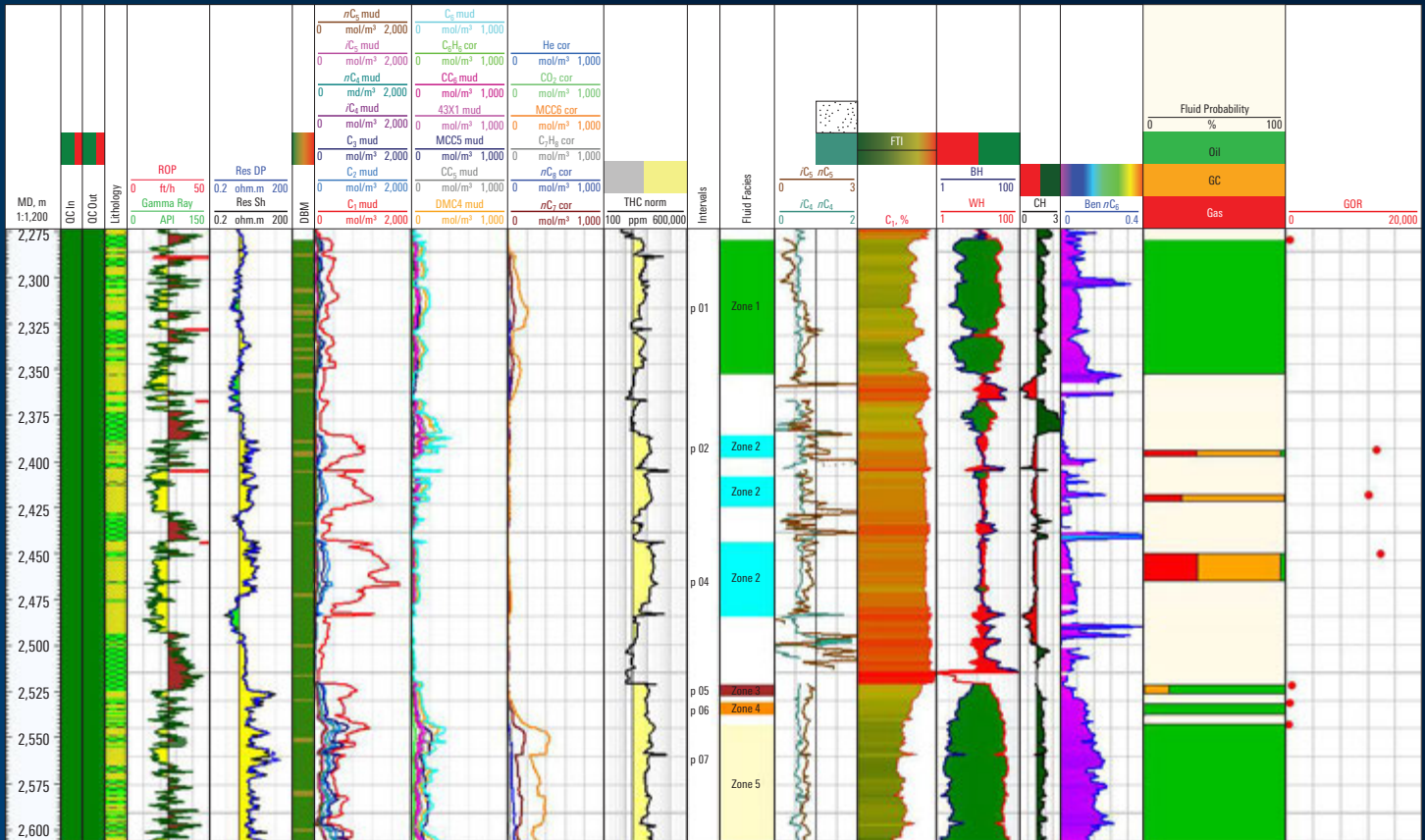
Improve accuracy of hydrocarbon data

The FlairFlex service continuously logs fluid data, which derisks and improves downhole sampling decisions. Integrating data from the FlairFlex service with data from other formation evaluation techniques provides a more robust and accurate picture of hydrocarbon in the formation.

C_n , Mole %	Pilot Hole — FlairFlex Service	PVT Analysis	Sidetrack Hole — FlairFlex Service
C_1	89.2	89.2	89.5
C_2	6.1	5.9	6.0
C_3	2.4	2.1	2.5
iC_4	0.5	0.5	0.5
nC_4	0.9	0.8	0.8
iC_5	0.5	0.4	0.4
nC_5	0.4	0.3	0.3



Geoservices
A Schlumberger Company



FlairFlex service provides qualitative and quantitative analysis of extracted hydrocarbons from drilling fluid type and GOR.

Service Upgrades for Improved Reservoir Characterization

Calibrate extraction efficiency immediately

FlairFlex service equipment continuously samples drilling fluid from the flowline and from the pump suction line. Extraction occurs at controlled, constant thermodynamic conditions and can now be calibrated with a fresh drilling fluid sample, rather than after drilling has commenced. Hydrocarbons are continuously extracted and analyzed, enabling immediate quantification of C₁–C₆ composition.

Increase data integrity

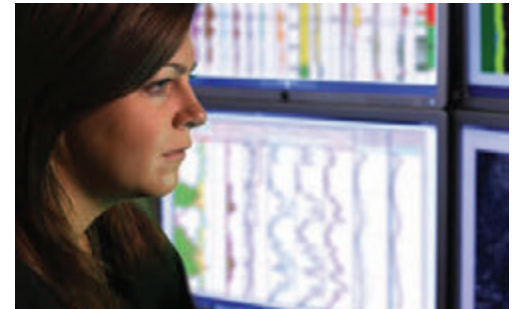
Processing of the acquired data includes synchronization of “in” and “out” data as well as filtering for drilling artifacts. The FlairFlex service features a virtually maintenance-free fluid extractor. Temperature regulation for extraction control has also been refined to increase precision.

Integrate FlairFlex data with other data sources

Our experts use the Techlog* wellbore software platform to generate fluid-facies logs and compositional analyses of various facies. These logs can be seamlessly integrated with other available formation evaluation data to enhance reservoir characterization. From daily quicklooks to more in-depth analyses such as multiwell studies, our data processing solutions help advance reservoir understanding.

Acquire advance formation evaluation with 3D modeling

In addition to traditional composition logs, the FlairFlex service can be integrated into models from Petrel* E&P software platform to provide advanced 3D visualization. This flexibility enables you to choose the appropriate level of service for your well.



A Schlumberger engineer reviews the hydrocarbon data captured by the FlairFlex service.

Case study: **Drilling**

Location: Malaysia

FlairFlex Service Reveals Thick Oil Zone Undetected by Basic LWD Measurements, Offshore Malaysia

A Malaysian operator evaluated potential pay zone with the FlairFlex advanced real-time logging and analysis service, correctly identifying oil and gas zones while drilling

The operator's concerns

An operator was drilling a wildcat exploration well offshore Malaysia in a thickly stacked sandstone reservoir. The operation required as much formation evaluation information as possible without exceeding the allotted budget. Accurate while-drilling formation evaluation information would ensure potential pay zones were not overlooked and would subsequently optimize the wireline sampling program.

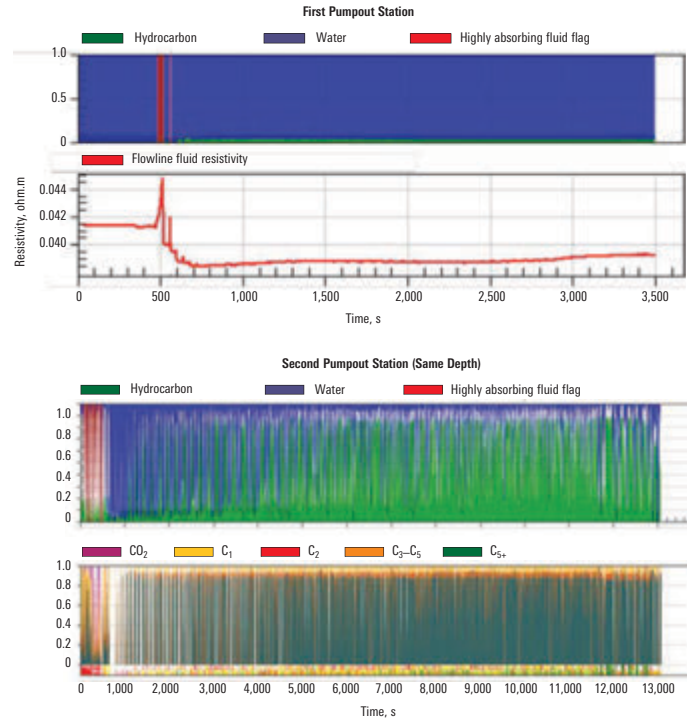
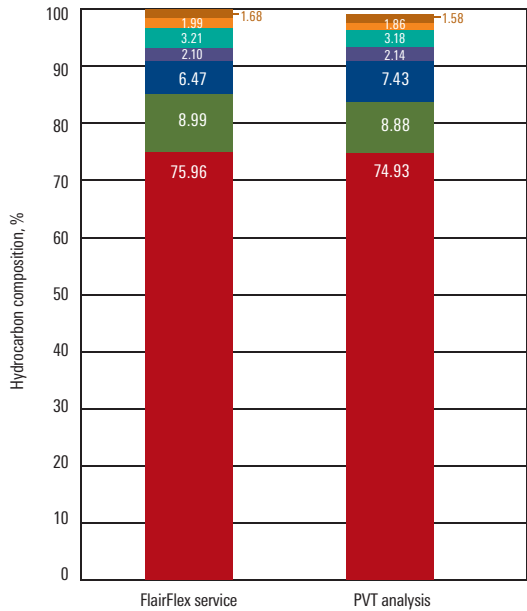
What Geoservices recommended

Geoservices, a Schlumberger company, suggested using the FlairFlex service to provide cost-effective and highly accurate formation evaluation information. The service quantifies, in real time, hydrocarbons present in fluid returns at surface, providing valuable downhole insight before downhole sampling or well testing operations are possible. This data adds confidence in reservoir evaluation interpretation and can be obtained independently from well conditions and with zero additional operational risk.

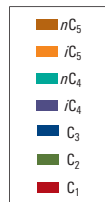
What the operator achieved

The FlairFlex service identified a thick hydrocarbon zone using real-time analysis, highlighting the presence of two fluids compositionally different. The FlairFlex service and LWD data characterized the upper part of this zone as gas. However, FlairFlex service fluid analysis clearly indicated the presence of oil beneath the gas zone, whereas LWD interpretation was inconclusive.

The operator subsequently collected two downhole samples in the gas zone and one in the potential oil zone. The downhole fluid analysis of the two gas zone samples confirmed the fluid type. But the fluid pumped from the suspected oil zone was initially identified as water, possibly water-based mud (WBM) filtrate. Based on the FlairFlex service analysis suggesting the presence of liquid hydrocarbon, the operator decided to reset the wireline formation tester and begin pumping at a higher flow rate. This enabled oil to break through and the additional collection of high-quality samples. Later PVT analysis results matched the C₁–C₅ composition from the FlairFlex service.



Real-time analysis from the FlairFlex service provided initial confirmation of an oil zone; PVT analysis showed strong agreement with the real-time fluid typing.



At the first pumpout station, real-time downhole fluid analysis determined that only water, or possibly WBM, was pumped. Operator confidence in the surface fluid analysis from the FlairFlex service resulted in resetting the wireline formation tester to pump additional fluid. Oil breakthrough was observed, and the pay zone was extended to this interval.

Case study: **Drilling**

Location: Malaysia

Real-Time Fluid Logging and Analysis Service Reveals Unexpected Oil Layer, Offshore Malaysia

PVT-analogous analysis using FlairFlex advanced real-time fluid logging and analysis service enabled operator to optimize sampling and discover an unexpected layer of heavy oil

The operator's concerns

The plan for a wildcat exploration well in a block located offshore Sarawak, Malaysia, was intended for testing hydrocarbon type and potential in clastic reservoirs. However, budget constraints forced reductions in the evaluation program, risking poorer quality and quantity of information acquired. The operator needed a cost-effective solution for early acquisition of quality formation evaluation information, which would drive the subsequent sampling plan for future appraisal wells.

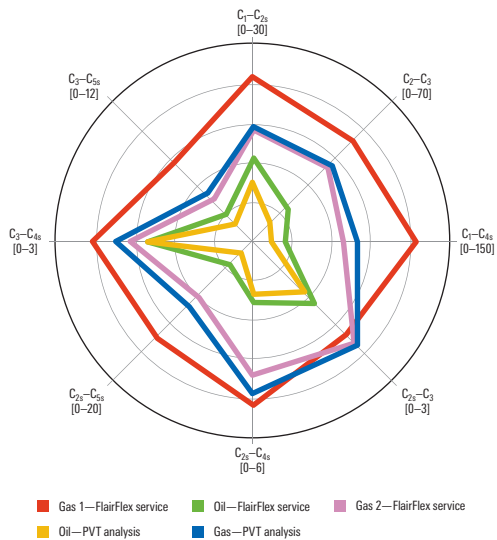
What Geoservices recommended

Geoservices, a Schlumberger company, recommended optimizing the sampling plan based on at-surface fluid-logging-while-drilling results. The FlairFlex service provides early insight into reservoir fluid through PVT-analogous composition logs and qualitative measurement of heavier hydrocarbons and other markers. Hydrocarbons are extracted from mud returns at surface in real time, providing valuable downhole insight before downhole sampling or well testing is possible.

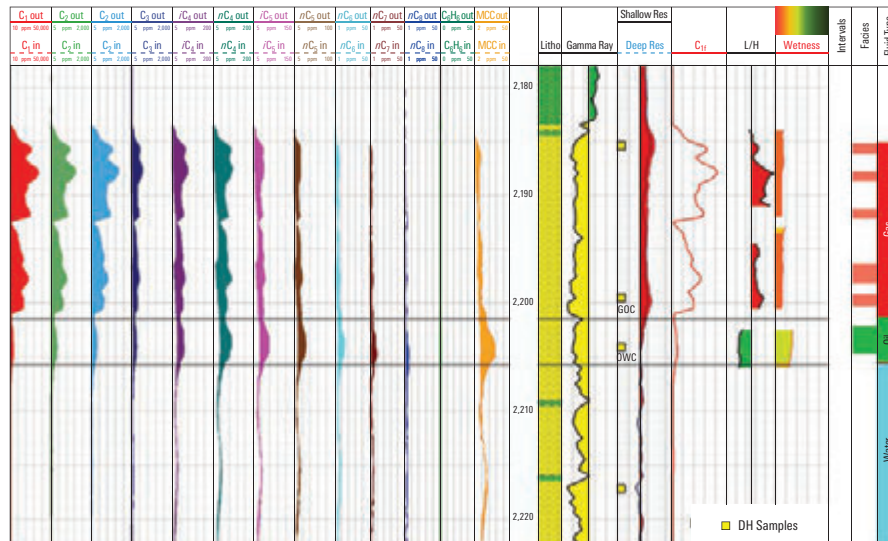
What the operator achieved

Using the FlairFlex service, the operator detected a thick column of relatively light fluid overlaying a layer of sandstone containing the presence of fluid components in the C₆–C₈ range. The appearance of the heavier fraction (*n*C₆–*n*C₈) and methylcyclohexane (MCC6) suggested the presence of liquid hydrocarbons. Fluid markers such as wetness and light/heavy ratio confirmed the presence of gas on top of a light oil. Nearly no hydrocarbon was recorded below the oil zone, and Schlumberger experts interpreted this section as water bearing. Comparison with offset PVT analysis further confirmed the presence of gas and oil.

Based on the results from the FlairFlex service and the petrophysical logs, the operator reviewed its wireline sampling program and added a downhole sampling station in the potential thin oil zone. The collected sample confirmed the fluid type described by the FlairFlex service. Later, a full PVT analysis also confirmed the C₁–C₅ compositional analysis from the FlairFlex service.



This star plot is a visualization of real-time fluid analysis from the FlairFlex service and offset PVT sample fingerprints.



The FlairFlex service accurately identified oil/water and gas/oil contact, providing critical input for reviewing sampling operations.

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