

## The most accurate light hydrocarbon detection service on the market

Coupling high quality gas extraction with an extremely precise light hydrocarbon chromatograph, G5 enables GEOLOG to make the best analysis of the C1-C5 gas spectrum. The utilization of standard mud logging crews working within the framework of proven quality control and analysis procedures yields very reliable, accurate data. The results can be related to formation fluid composition in a quantitative way when used with the constant volume mud trap, mud heating, contaminant removal and delta gas features of the service.



## Benefits

- Cost-Effective formation evaluation solution
- Monitor mud gas data for OUT and IN flow lines to compensate for recycled gas effects
- Gas While Drilling Interpretation GWD™ can be used
- Identification of Gas/Oil and Oil/Water contacts in real-time
- Supported by standard mudlogging crew

## Applications

This service supports exploration and appraisal wells by maximizing the quality of light gas data. In development projects G5 can provide useful well correlation models of gas trends.

The system has a track record in all environments comprising ultra deep-water, arctic, desert and tropical operations for evaluation of clastic, carbonate and unconventional reservoirs.

## Challenges and Solutions

In challenging High Pressure High Temperature wells, it can be difficult to perform formation evaluation with Logging While Drilling (LWD) or wireline tools where extremely heavy weight oil-based muds affect logging or temperatures may exceed tool specifications.

*At a minimum, the use of the G5 service can obtain gas data at surface from the “first breath” of the well while drilling. Resulting in unaffected data from well conditions and reducing downhole risk by utilizing an “at surface” solution.*

With reduced budgets operators are forced to make changes in formation evaluation programs. Downhole sampling programs can be extensive and costly.

*The G5 service enables operators to reduce time, and costs for these downhole sampling programs. Inherently the service is provided at surface with no increased risk, yet provides clear continuous formation fluid identification.*

*Allowing operators to pick and choose only the necessary pretest and sampling points to further refine reservoir characterization and reduce time downhole.*

## Indonesia Offshore Kutei Basin Case History well Formation Fluid Prediction Crossplot

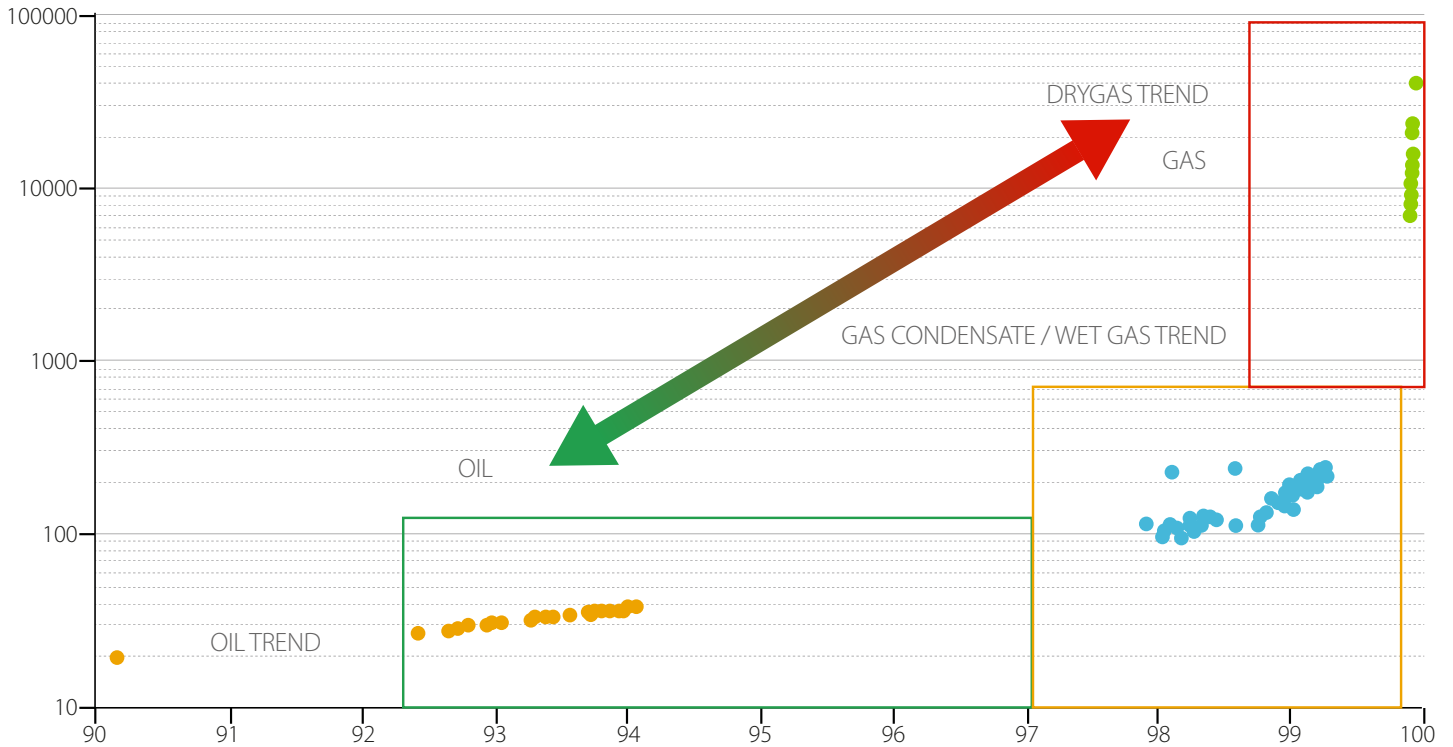


Figure 1. The Green, Yellow, and Red blocks outline the predictive model developed in the Kutei basin for determining fluid typing.

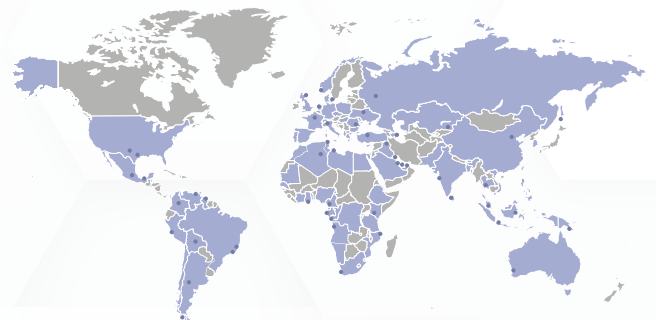
- New well GAS DRY level
- New well WET DRY level
- New well OIL level

To improve the reliability of the GWD™ interpretation, a predictive model based on the relationship between mud gas ratios and PVT derived results was defined using data sets from ENI E&P reference wells drilled in the Kutei basin. The model applied on the offshore Indonesia wells describes a well-defined crossplot (Formation Fluid Prediction Crossplot or FPC). The data recorded in Real-Time enabled the identification of three different fluids (gas, oil, condensate) in different sections of the well. The technique is calibrated for individual basins.

### Specifications

Hydrocarbon Analysis	C1, C2, C3, iC4, nC4, iC5, nC5
Limits of Detection	1ppm-1.000.000ppm (100%)
Analysis Time	45 seconds

### GEOLOG around the World



### Technical Paper References



Advanced Mud Gas Detection System Improves Formation Fluid Characterization While Drilling in Challenging Indonesia Deepwater.  
IPA12-E-014 (Indonesian Petroleum Association, Jakarta, May 2012, Eni)