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INTELLIGENT GAS DATA

Maximising the value of formation fluid real-time analysis by **Gionata Ferroni,**
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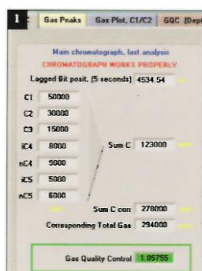
Surface logging systems provide crucial information on reservoir presence, precise top and bottom depth, and fluid contacts. This is obtained primarily via the analysis of gas data.

This data has a value which is particularly important in real time and near-real time, where often there is little other information available, and decisions nevertheless need to be taken. And yet it is often overlooked. At Geolog we are changing that.

Granting the data quality is the only way to provide added value through a system, surface logging, which although being rather sophisticated, is quite humble if compared to the very powerful means
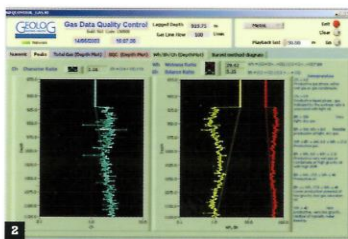
of the oh-so-expensive LWD systems.

Geolog has been actively working on all sides of the problem, and has developed an intelligent system to provide 'quick-look' gas analysis and inter-

pretation, as well as a system for constantly and automatically quality-checking the data provided.

In fact, one of the historical limits of the gas measurements while drilling is that they are often non-repeatable. We make our gas data become as repeatable as possible to give the final users of this information the needed confidence in the data they have in hand.

Geolog has developed its system taking into account the specifications from the more advanced analysis technique – the Gas While Drilling (GWD)™ technique.

The QC tools constantly informs our operator on the ratio between our two main gas instruments, the FID Total Gas Detector, and the FID Chromatograph. The weighed ratio between them, in a perfect world, would be equal to one. In reality a tolerance comprised between 0.8 and 1.2 is accepted.

In case the gas ratio is not within these boundaries, an alarm is triggered and the operator is informed that the gas detection must be looked into. If the ratio is <0.8, a possible calibration inconsistency is present. If it's more than 1.2 several scenarios are possible, but the overall consequence is the same: we guarantee that in an operation where 24/7 monitoring is required for months on end, any data discrepancy is detected and tackled in real time. This information is then presented and plotted for the entire well section.

This type of QC guarantees the validity of the gas data gathered, overcoming many of the uncertainties related to gas analysis.

This approach is aimed at splitting and simplifying the process of monitoring from that of

interpreting. Our operators on the field can therefore concentrate in doing near-real time interpretation, because the system has automated real-time monitoring. All the basic ratio analysis are automated and displayed. In particular, the Pixler Ratios, which reflect the composition of the gas associated with the formation fluid, are automatically updated every minute, so that the passage from a type of fluid to a different one can be appreciated at a glance by anyone involved in the operation without having to operate data downloads, transfers or re-processing.

The same facility is available for the most common ratios (Wh, Bh, Ch) utilised to spot formation or fluid contacts: how important it is to be able to spot or confirm a reservoir top (or bottom) minutes after it has been drilled? And how important it is to be able to do this without the 'filter' of the operator who would need to download the data and work on them before he can provide the result?

Figure 2 shows the use of intelligent software is shorten the process of transforming electrical signals in real information. Let's look at a standard scenario, in which the operator is in charge of carrying out all the analytical tasks and therefore has to manage his time accordingly. As a result, no immediate analysis is done, and the only moment in which decision-making occurs is after the well is drilled.

- real time (0-2 hours after drilling): data acquisition;
- near real time (2-24 hrs): data QC and preliminary analysis;
- offline (after well TD): advanced analysis – **decision-making**.

The utilisation of an intelligent software tool, such as Geolog's Gas Data Quality Control package, enables to shift all the process towards the real time:

- real time (0-2 hours after drilling): data acquisition, QC and preliminary analysis;
- near real time (2-24 hrs): advanced analysis – **decision-making** is possible;
- offline (after well TD): post well review – field wide/offset correlations.

Machines are supposed to liberate men from trivial tasks so they can concentrate on more advanced and fulfilling ones. The Gas Data Quality Control Package developed by Geolog and deployed in each of its systems worldwide is aimed at doing just this. **ep**
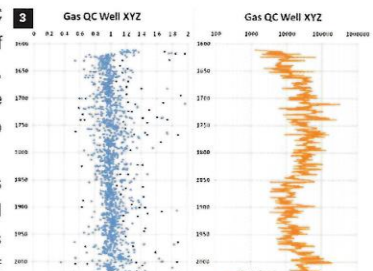
FIGURES 1 The automated QC display **2** The main gas ratios Wh Bh Ch are plotted in real time
3 The gas data QC of a well plotted against the total gas value