Key Competitive Advantage

Of

DNL Logging Services

HPT (High Precision Temperature)

HPT technology is based on the high precision temperature readings accomplished by software temperature simulator.
DNL temperature simulation software is absolutely UNIQUE. It simulates flowing and shut-in temperature in injectors and producers including the complicated multiphase flows.
The simulator accounts for all valuable inputs and is capable of reproducing the temperature all the way from the surface down to the bottom-hole with a stunning half-foot resolution.
Methodology of input data pre-processing and matching the model to the actual logs is the result of multi-year R&D and now stands out as an absolutely unique service.

1. New Information

Unlike spinner, the HPT allows flow evaluation behind the tubing and casing.
HPT allows tracking very small flow units which are overlooked on PLT temperature.
PLT temperature readings cannot be used in numeric simulations due to a very poor quality and repeatability.

Compared to conventional high resolution logging, HPT tool has better response time. HPT software avails numeric simulation of flowing and shut-in temperature logs which takes temperature logging to another level of qualitative flow evaluation.

HPT greatly contributes to the multiphase interpretation which allows numeric modeling of complicated multiphase flows such as gas + oil + formation water + injection water.

If HPT is recorded in an injector after a 2-3 days shut-in (static HPT), the simulations can evaluate the injection volumes across the old injections zones (which are no more active) which is very helpful in 3D reservoir simulations.
If HPT is recorded in observers or producers after a 2-3 days shut-in (static HPT), the simulations can evaluate the regional water propagation profile.

2. Sensitivity

A big advantage of HPT is the supersensitive fast-response temperature sensor which along with a slow cable speed (2m/min) allows tracking the temperature responses to the smallest flow units which are overlooked on the regular PLT.

3. Conveyance

HPT is a memory tool which avails a cheap and easy-available slick-line conveyance.

SNL (Spectral Noise Logging)

SNL sets up a new milestone in noise logging as it is the first commercial tool which is recording the noise in a wide frequency range (100 Hz --- 60 kHz) with extremely high frequency resolution (100 Hz step). The way data is registered and processed is absolutely unique which is summarized in SNL color panels. In a unique way, SNL Processor eliminates uncorrelated noise and sets focus to the correlated noise which is normally produced by reservoir and borehole flow.

1. Functionality

The tool features NEW information – such as NOISE SIGNATURE which helps identifying the noise origin. For example, it can differentiate between channeling and borehole noise and between borehole noise and reservoir flow.

The most impressive application of SNL tool is to pick up a weak reservoir noise behind the tubing/casing while the tool is located in tubing with a huge borehole noise effect.

2. Sensitivity

SNL features a new supersensitive hydrophone sensor which outperforms all other sensors on the market. There was a clear and straightforward test of SNL against other competitors where DNL SNL was able to capture the faint leak in C-annulus while no other tool could hear anything.

3. Conveyance

SNL is a memory tool which avails a cheap and easy-available slick-line conveyance.

MID (Magnetic Imaging Defectoscope)

MID tool belongs to the category of time-domain tools while the most popular market tools work in frequency domain. In theory, it was understood long time ago that time-domain tool (i.e. producing the square-shape pulses and recording the time response) may provide much more information than frequency-domain tool. For example, time-domain interpretation needs less input parameters and provides better accuracy in thickness evaluation than frequency-domain tool. Time-domain tools can discern between various completion elements while frequency domain tool are limited to thickness evaluation only.

On the other hand, time responses require much more complicated and computation-consuming mathematics to model and this was the main obstacle for the practical application of time-domain tools over the last 30 years.

With advent of new computational facilities, our partner (TGT Oil and Gas Services) has managed to build a new generation of electromagnetic response modeling software which allows retrieving much more details from the time responses than before.
Particularly the new software allows viewing the RESPONSE SIGNATURE which is varying between various completion elements.

1. New information

MID identifies many completion elements (like packers, gas lift mandrels, SSD, X-Nipple, various X-overs etc.) through the typical time response pattern.

MID is capable of monitoring the presence of 4 barriers up to 20” OD.

2. Sensitivity

MID features very early time recording (starting from 0.1 ms) which allows high resolution scanning of near-field barriers and this is unavailable with regular time-domain tools.
The most impressive application of the early time recording is monitoring the quality of perforations.

This also allows capturing fast die-away responses in stainless steel completions where most conventional tools fail.

3. Conveyance

MID is a memory tool which avails a cheap and easy-available slick-line conveyance.