

**Case study:** Gulf of Mexico, United States

# Remote logging operations collected all fluid samples, pressures in one run, saved \$581,400 USD

A customer in the Gulf of Mexico was drilling an exploration well and needed to quantify the formation evaluation data to properly plan the production strategy for the well. Previous wells in the play were problematic due to tool problems and well conditions. It was critical for the customer to get all of the possible wireline formation evaluation data and a key priority was to obtain good nuclear magnetic resonance (NMR) data to be able to define effective porosities and calibrate the geological map of the reservoir. The customer also needed to identify the pressure transient to properly identify the water/oil contact along with getting hydrocarbon samples to plan the production strategy.

The customer was aware of Baker Hughes's remote logging capabilities and requested the **Sabio™ Log from Anywhere service** to minimize the personnel on the rig. Using the remote logging capabilities of the Log from Anywhere service, the customer hoped to reduce the personnel on board from nine to six. The plan was to use the rig internet for connectivity to shore, but the rig internet connectivity was unstable and could not support the remote logging data. Baker Hughes mobilized one of its satellites as a backup, and this proved to be the best solution for effective connectivity.

This reliable connectivity was critical due to the number of advanced logging services and the impact the logging data would have on the

production strategy for the well. The advanced logging services were: dual **Enhanced iMager eXplorer™ (EMeX™) imaging service, 3D eXplorer™ (3DeX™) induction logging service, MR eXplorer™ MReX™ nuclear magnetic resonance (NMR) service, Formation Lithology eXplorer™ (FLex™), FTeX™ advanced formation pressure testing service, RCX™ Sentinel focused sampling service, and MaxCOR™ sidewall coring tool.**

The net operating time to execute the full range of services was 152 hours. Each logging job is unique but similar jobs run conventionally had taken from 210 hours up to 287 hours.

The Log from Anywhere service considerably improves operating efficiency. In a conventional logging operation, the engineer at the wellsite has to generate all of logs but is also responsible for many other duties like the renewal of the permit to work, toolbox meetings, rig up, and rig down. This limits the opportunity to work on the log deliverables to when the tools are being tripped out or into the hole. Using the Log from Anywhere service enables the remote engineer to work on generating the logs immediately after the data acquisition is completed. The wellsite logging supervisor focuses on getting ready for the next run.

The logs were generated in the remote operation center (ROC) and delivered to the customer via high-speed internet. They were finished three hours

## Challenges

- Deepwater exploration well requiring a full suite of petrophysical data
- High priority on NMR data, pressure transient, hydrocarbon samples, and core plugs
- Internet connectivity
- Large number of people on the rig

## Results

- Acquired full suite of petrophysical data
- Delivered data on customer servers three hours earlier than average
- Saved a wireline run by achieving all samples and pressures in a single run
- Provided Baker Hughes satellite connectivity with 100% uptime
- Reduced offshore wireline crew from nine to six people

faster compared to conventional logging, and this enabled excellent collaboration with the customer's subject matter experts to pick the pressure stations, NMR intervals, and coring intervals. The fast turnaround on the NMR data enabled extra time to pick the sampling depths for the subsequent run.

The Baker Hughes team was recognized by the customer for the very successful collaboration with their subject matter experts as well as the team work with the rig

operations team. There were nine sample stations that filled 34 small volume tanks (620 to 840 cc per tank) plus two additional large-volume (4-L) tanks for a total of 31 liters of hydrocarbon samples. The customer appreciated achieving all fluid samples and pressure in one run, saving 18 hours and \$581,400 USD.

