

# Reperforating with LIVE Perf Services Returns Shut-In Wells on Mediterranean Platform to 3,700-bbl/d Oil

Real-time depth correlation from the lightweight combination of LIVE Perf digital slickline perforating services and eFire electronic firing heads

**CHALLENGE**

Reperforate shut-in wells with strict depth control requirements on a low-weight-limit platform.

**SOLUTION**

Combine lightweight LIVE\* digital slickline services with eFire\* electronic firing heads for two-way telemetry and full command of firing operations.

**RESULTS**

Conveyed and correlated 12 perforating runs on depth; brought wells online to 3,700 bbl/d of oil.



**Specialized reperforation strategy needed**

The operator of a satellite platform in the Mediterranean Sea had to shut down production owing to poor well flow performance. The wells could not be reperforated with a conventional electric line package because the platform had a 4.5 metric ton crane limitation. Only a lightweight slickline package could be used for intervention. Accurate depth control with surface readout was also an essential requirement because the zones to be reperforated were located near sensitive completion components. Thus, using a memory-only system was ruled out.

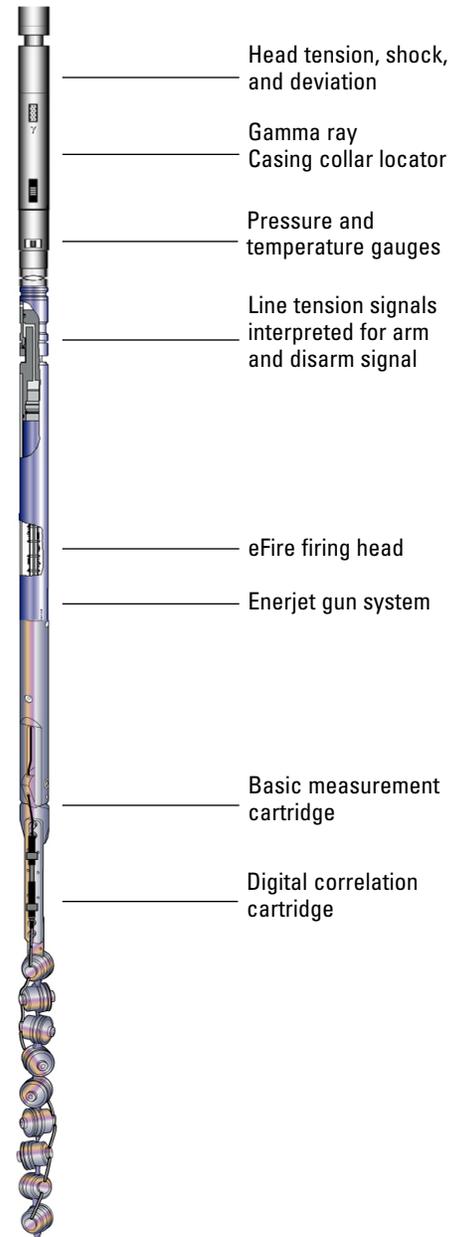
**LIVE services combined with electronic firing heads**

LIVE Perf\* digital slickline perforating services were selected to address the operational constraints at the two Mediterranean wells. Compared with a standard slickline cable system, the LIVE digital slickline services have an integral coating that enables two-way telemetry between the surface acquisition system and the conveyed tools downhole.

LIVE Perf services were combined with the Enerjet\* expendable strip gun system and eFire electronic firing heads. The eFire heads use a pressure transducer to convert tool hanging weight related to line tension into electronic signals used to command the tool operation. Signals are sent to the tool with unique sequences of cable movements controlled by the slickline unit to arm and disarm the tool and command it to fire.

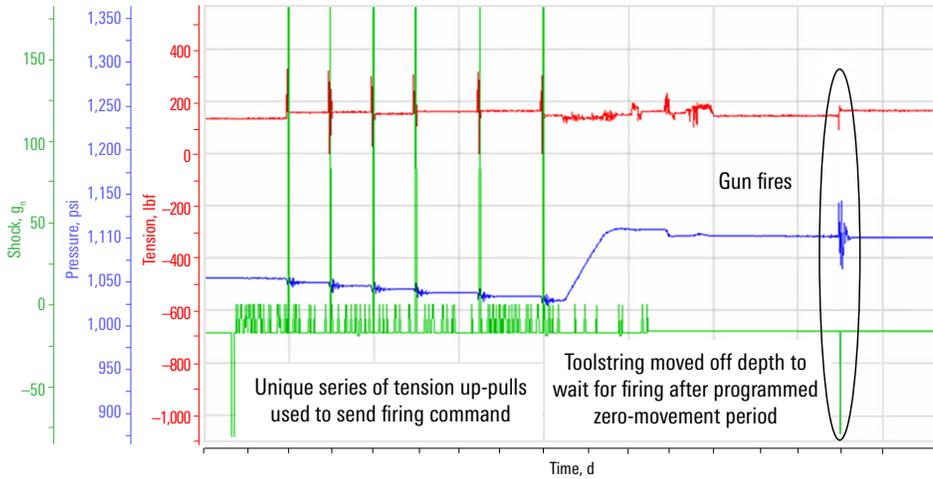
**Production restored by reperforating with LIVE Perf services**

The full integration of LIVE Perf digital services, Enerjet gun system, and eFire firing heads made it possible for a single crew to perform both conventional slickline and reperforation operations using the same intervention package.



*Integrated toolstring with LIVE Perf services, the Enerjet expendable strip gun system, and eFire electronic firing heads.*

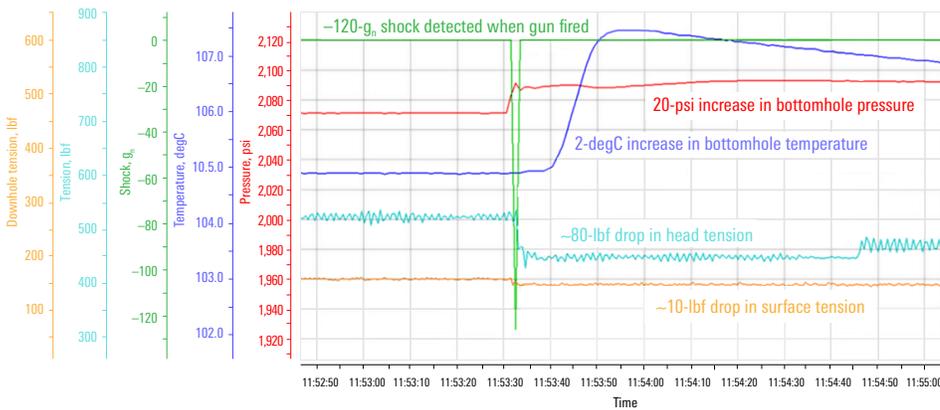
# CASE STUDY: Reperforating with LIVE Perf services for 3,000-bbl/d oil, Mediterranean Sea



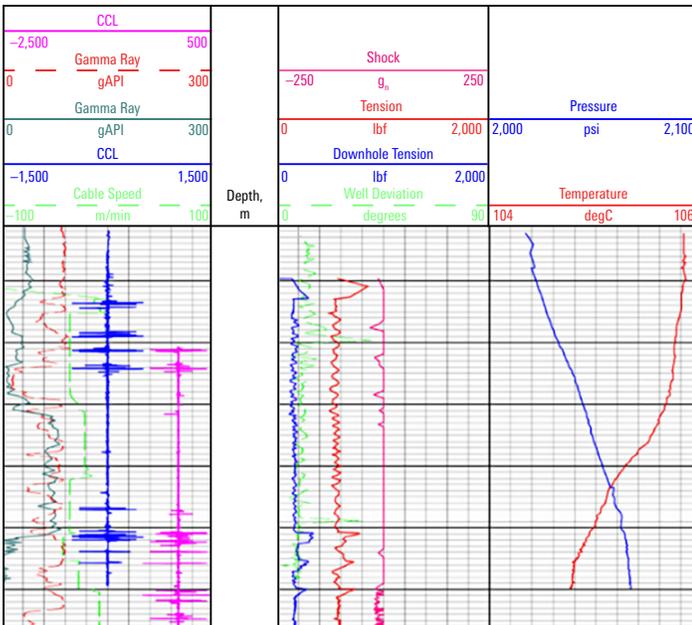
The team measured cable tension, shock, well deviation, and tool movement with the LIVE services' downhole basic measurement cartridge and monitored the data in real time at surface. Depths were precisely correlated by using gamma ray and casing collar locator (CCL) measurements.

The real-time data also provided immediate downhole shot indication that would not have been possible with a conventional slickline system. Both wells were reperforated with a total of 12 runs for resulting production of 3,700 bbl/d of oil.

Real-time measurements acquired by LIVE digital slickline services during firing.



Real-time measurements acquired as the gun is shot.



Accurate depth correlation from gamma ray and CCL in real time.

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**Schlumberger**