

Case Study:

PulseEight wireless intelligent completion system successfully deployed as fully digital solution

Demonstrating the world's first cloud-connected downhole wireless communication from reservoir to desktop

Well Data

Location: Onshore Austria	
Well Type: Gas Storage	
Installation Date: December 2017	
Tubing Size: Horizontal Wells, Retrofits	
Production rate: 4-6mscf/day	0.11-0.17MMm3/day
Pressure: 112bar	1600psi
Temperature: 40°C	104°F



Following on from previous installations of PulseEight systems where TAQA's Fluid Harmonics telemetry has been successfully proven using manual interpretation techniques, a further step was required to configure the system as a fully digital solution.

This would provide the opportunity to fully prove the digital oilfield capabilities of the system on a live producing well.

TAQA Solution

With the purpose of showcasing a fully digital solution, TAQA looked to install a complete system on an existing well which had no monitoring & control infrastructure, and do so efficiently to prove the suitability of this technology for mature and existing assets. The chosen system consisted of 3 individual components which can easily be transported to any wellsite.

The wireless wellhead sensor was installed on the wellhead, upstream of the surface choke, and the Surface Acquisition Unit (SAU) was installed in a safe area roughly 100m from the well bay. Confirmation that the wellhead pressure data was being transmitted to the SAU and that it was visible through the cloud-based server was required before installing the downhole component.

A PulseEight Interval Control Valve (ICV) was successfully deployed using the client's slickline service and set in an existing nipple profile at 1130mMD, with the operation performed in little under 3hours. As a result of the tool's

multi-compatibility with existing systems, no special arrangements were required for deployment and the valve was set using standard lock mandrel procedures.

The well was brought back on-line within 15 minutes, and after a pre-programmed delay period, the valve began communicating with surface a start-up sequence automatically commenced to optimise the Fluid Harmonics telemetry parameters.

This start-up sequence was transmitted through the cloud-based server and viewed remotely by both the field team and office staff on their smart phones.



PulseEight ICV installation

Project Results

Over the following 4 months, the ICV communicated multiple times to surface, sending pressure/temperature telegrams and valve diagnostics. It also responded to wireless commands sent from surface to request a change in parameters.

All interactions were viewed across multiple platforms by field crew and staff in both office and remote locations.

The pressure and temperature data received at surface was decoded through the PulseEight surface system and made available to the client in real time, while the ICV was left in hole to sending weekly pressure and temperature data.

The PulseEight software system was able to not only identify, but also interpret signals of only 2psi across the flowing wellbore pressure regime. This illustrated the limited effect the signalling Fluid Harmonics creates during communication but also the sensitivity of the system to pick up signals of just 0.14% of surface flowing pressures.

This data was used to monitor the depletion in the reservoir observed during the initial rapid decline characteristics of gas storage wells. It provided invaluable information not otherwise available to the operator.

Following the successful data gathering phase, the ICV was asked to close using Fluid Harmonics surface commands. The ICV then closed after the final command receipt, providing isolation of the well flow downhole. The device was then retrieved some time later and visually confirmed to be closed.

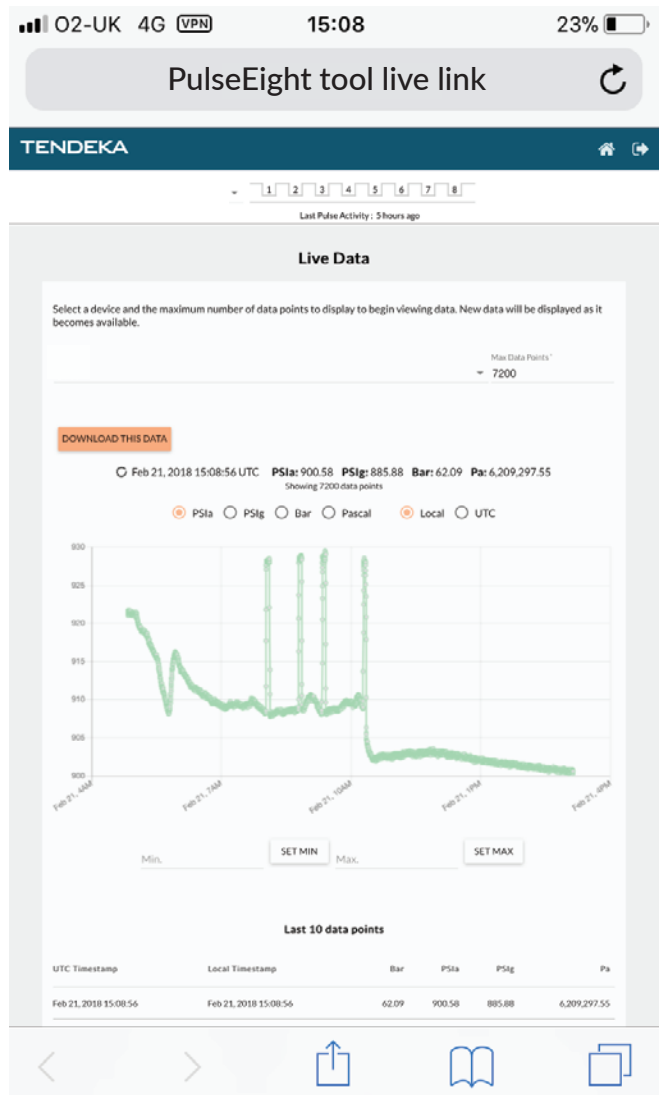
With the data being observed and interpreted automatically on remote devices, and the successful valve closure, the test has proven that reservoir data can be shared using a fully wireless system to any location in the world. It also demonstrated wireless well control is possible using TAQA's Fluid Harmonics telemetry, and how elegantly simple it is to install this through-tubing system in an existing well.



PulseEight System



PulseEight ICV installation



Screen capture of realtime data on mobile phone device