

Expro Excellence

Downhole monitoring for unconventional gas field development

Wireless Well Solutions



Objectives and background

- A major operator in North America needed to optimize well spacing to ensure the effective development of their unconventional gas field
- The tight gas field in Wyoming, consisted of discontinuous lenticular sands with up to 50 fluvial reservoir sandstones, spread over a 6,000ft gross section
- Measuring the true formation pressure from the micro-darcy permeabilities is a challenge and presents significant uncertainties over lateral continuity, drainage area and optimal well spacing
- Each well is completed with many frac stages and previous pressure measurements had been inferred from drilling and fracture injection tests, which were considered less accurate
- It can take months for pressures to stabilize and provide accurate readings due to transient impairment caused by overbalanced drilling
- The best solution is to drill a pilot hole and observe the pressure in individual sand packages in one well while producing from another. However, future options to produce from the initial pilot well may be compromised
- Using a to-be-abandoned well as a monitoring asset provides a cost-effective method for reservoir monitoring, without having to drill a new well for observation purposes

Expro Excellence

- Expro installed 10 CaTS™ wireless gauges in separate isolated zones in an old production well that was due to be abandoned
- Expro wireline crews performed a sequence of single zone perforations and plug isolations with a CaTS gauge to monitor each zone
- The gauges provided up to 3 years of wireless monitoring, transmitting a single pressure and temperature data point every 1 to 2 days

- The gauges were set below plugs at intervals from ~9270ft to ~7380ft
- Using conventional abandonment plugs also allowed cement plugs to be set where required as part of the permanent abandonment philosophy
- As the well was previously a producing well, the gauges were set to monitor existing perforated zones and additional newly perforated zones
- A new production well was drilled 450ft away allowing for pressure interferences to be detected by the abandoned monitoring asset

Value to the client

- An old well, that was to be abandoned, was successfully converted into a high value, multi-zone reservoir pressure monitoring asset in an unconventional gas field
- The CaTS gauges provided the first accurate virgin reservoir pressure measurements in the field and showed reservoir pressure equilibrium was reached 4 months after installation
- Depletion was observed due to the production from the new well after 40 days of production, which confirmed good connectivity
- The data was used to construct a detailed reservoir model and helped determine drainage area and optimize development well spacing
- Advanced Reservoir Testing using CaTS gauges is being used to reduce reservoir uncertainties, resulting with optimized field development plans for our customers
- Wireless monitoring using CaTS gauges provides a long-term, retrofit, real time monitoring solution that can provide accurate measurements of reservoir pressures
- CaTS gauges are being used to reduce reservoir uncertainties to optimize field development plans and deliver significant value to our customer

Bespoke solution



New technology



Contact

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