Case Study Pack

SONICGAUGE™
WIRELESS MONITORING SYSTEM

COMPANY OVERVIEW

Acoustic Data is a global leader in wireless downhole communication, serving the Oil & Gas and Underground Energy Storage industries. Headquartered in Woking, United Kingdom, we specialise in proprietary acoustic telemetry systems that enable real-time downhole data acquisition and remote equipment control.

Our patented technology empowers operators to optimise well performance, enhance operational efficiency, and reduce costs, delivering smarter, more reliable solutions across the well lifecycle.

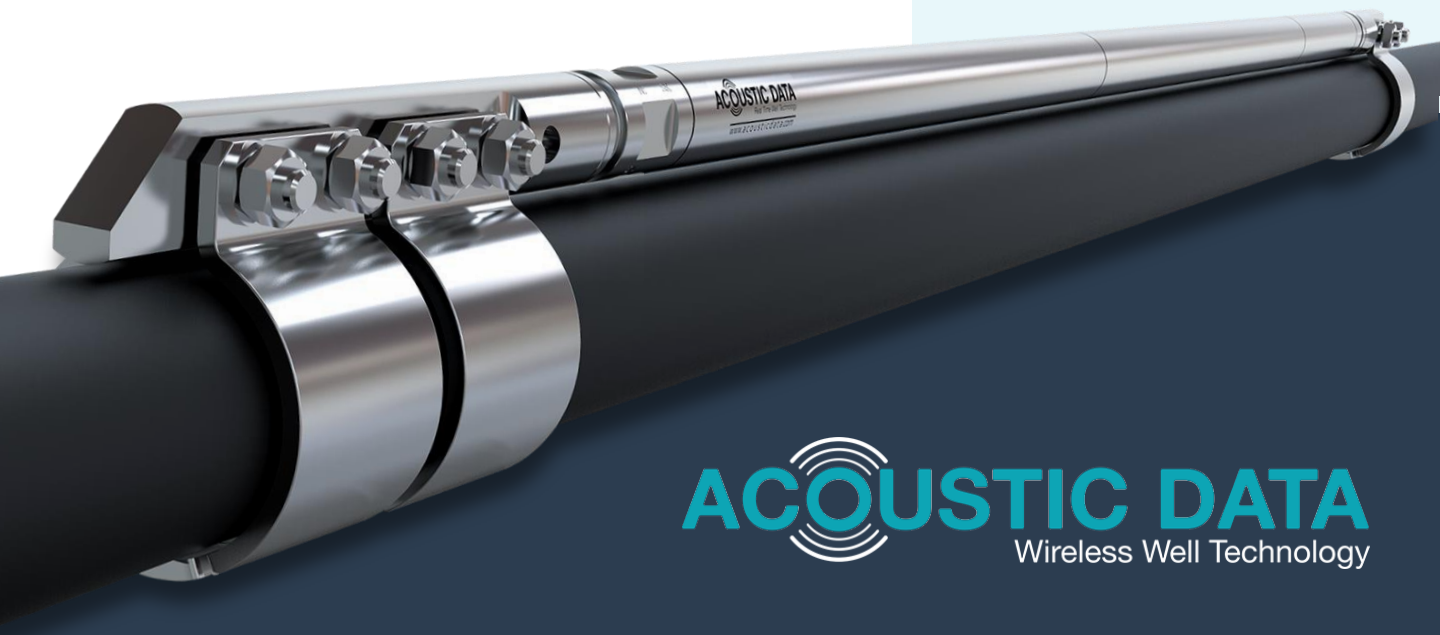
TECHNOLOGY OVERVIEW

The SonicGauge Wireless Monitoring System is a two-way (duplex) acoustic telemetry system that measures and wirelessly transmits wellbore pressure and temperature from downhole to surface in real time.

The downhole gauge systems are ideal for providing bottomhole and gradient/multi-zone data during the production, injection and monitoring phases of well operation. There is no depth limitation, as SonicRepeater stations can be used to boost the acoustic data packets to surface.

The downhole tools can be mounted on tubing, in the wash pipe or retrofitted through tubing on the Barracuda HEX-Hanger by slickline or e-line. Alternatively, for barrier verification, the SonicGauge can be mounted on the bottom of downhole tools such as retrievable bridge plugs, storm packers and inflatable packers.

- Reservoir Surveillance
- Interference Monitoring
- Artificial Lift Monitoring
- Production Well Testing
- Drill Stem Testing SRO
- Barrier Verification
- Sand Control Placement
- Underground Energy Storage Monitoring
- Carbon Capture & Storage Monitoring



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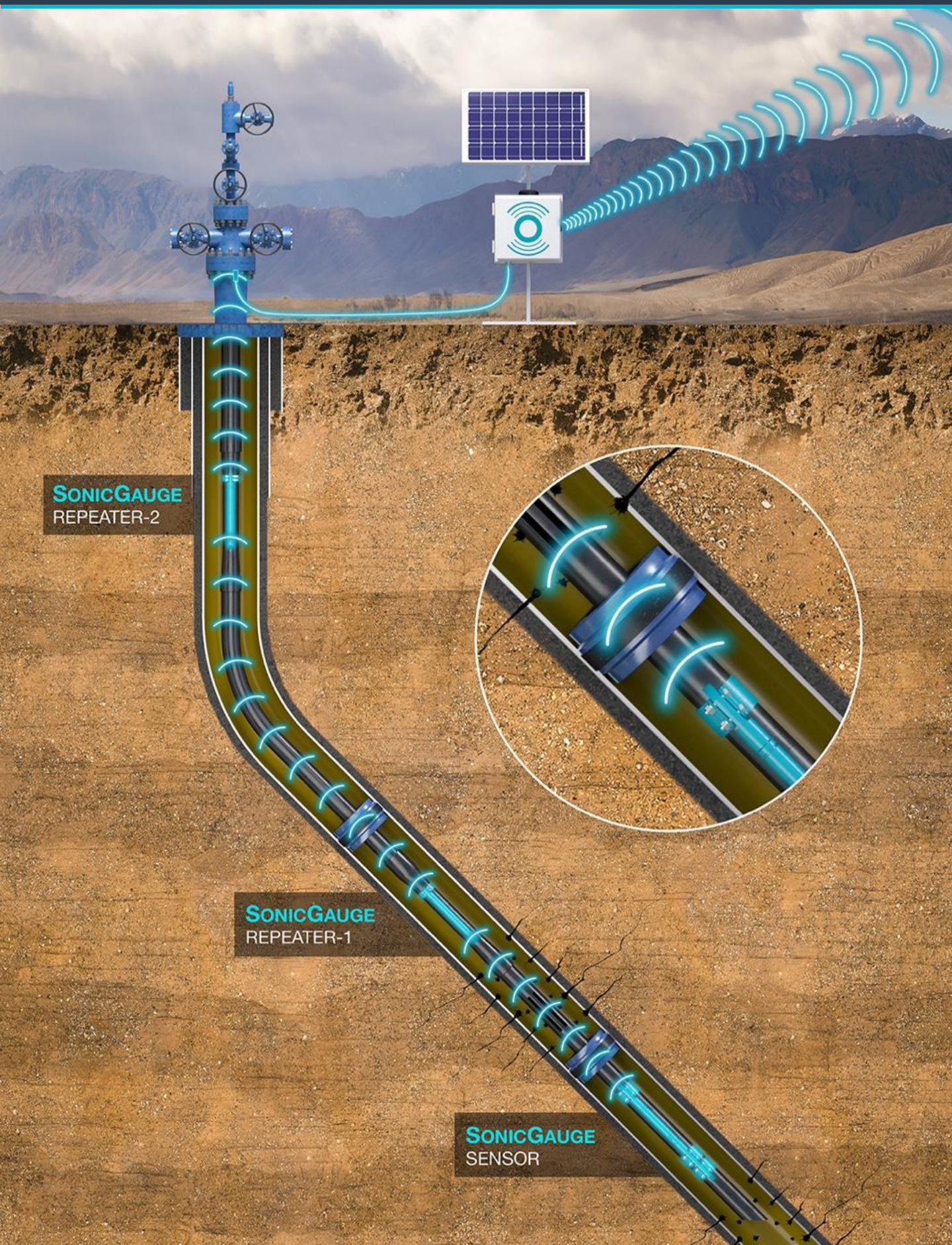
RESERVOIR SURVEILLANCE



SONICGAUGE™
WIRELESS MONITORING SYSTEM

LOCATION: SOUTH-EAST ASIA

Production Optimisation of Brownfield Developments

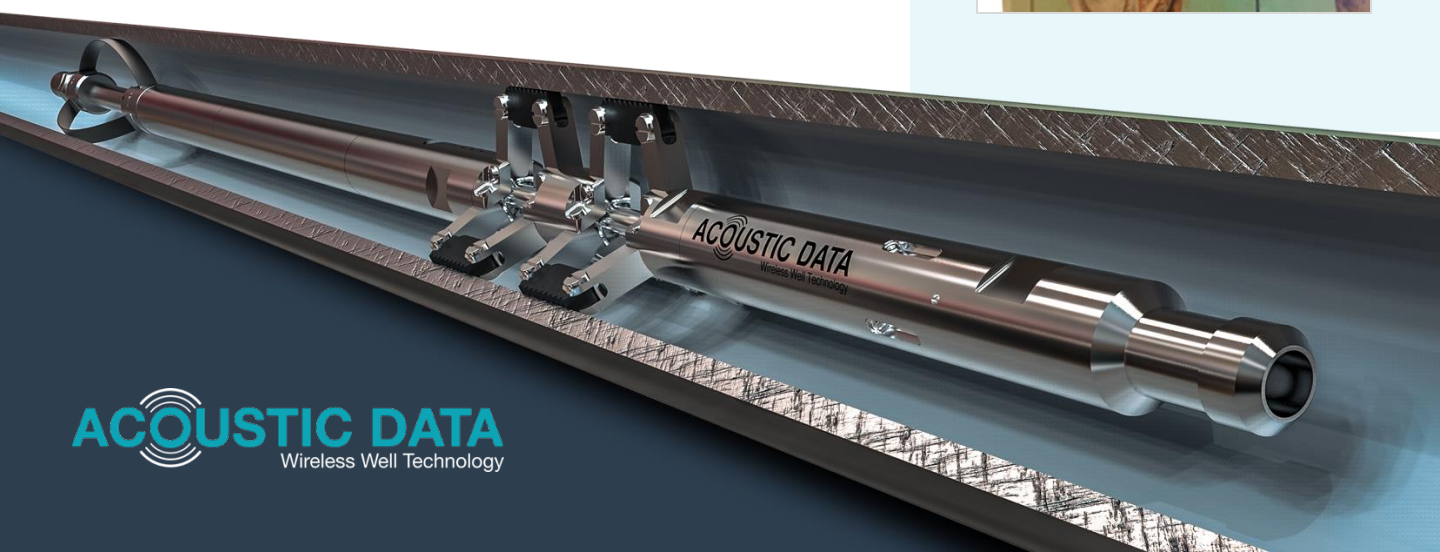
- An NOC is managing an ageing field where data acquisition capacity was lost in more than half of the wells due to cabled permanent downhole gauges becoming non-operational.
- Real-time data is required to manage the assets in production decline, assess reservoir properties and fast-track production optimisation initiatives.

SOLUTION

- Acoustic Data's engineers installed the SonicGauge System on an offshore platform using a local slickline company.
- The acoustic telemetry system was deployed on Barracuda HEX-Hangers that were set in 4-1/2" tubing by the Electro-SET.
- The SonicSync duplex communication modem was attached to the wellhead to fine-tune the system, start high-frequency data transmission, and poll the SonicGauge sensor for historical BHP/BHT data during a PBU operation.
- After the well was flowed to 20mmscf, the SonicSync changed the data schedule back to a 6-hour data rate in order to deliver up to 5 years of real-time downhole monitoring.

RESULTS

- The system was quick to install, and data was immediately sent from downhole-to-desktop via the platform SCADA system.
- The SonicGauge provided downhole data during flowing and shut-in conditions with no loss of production.
- The operator's future OPEX and carbon footprint have been significantly reduced by displacing memory gauge surveys, which also defer production revenue.



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LOCATION: ITALY

Assuring Reservoir Integrity & Regulatory Compliance

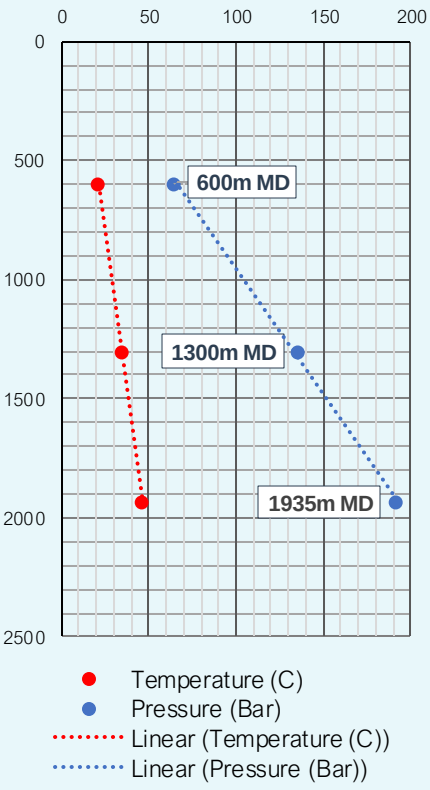
- Governments are increasing regulatory demands for monitoring underground energy storage volume/pressure and confirming caprock integrity on a frequent and long-term basis.
- An EU Operator had multiple wells without real-time monitoring systems, and downhole data for regulatory reporting was obtained via frequent memory gauge surveys at significant cost.

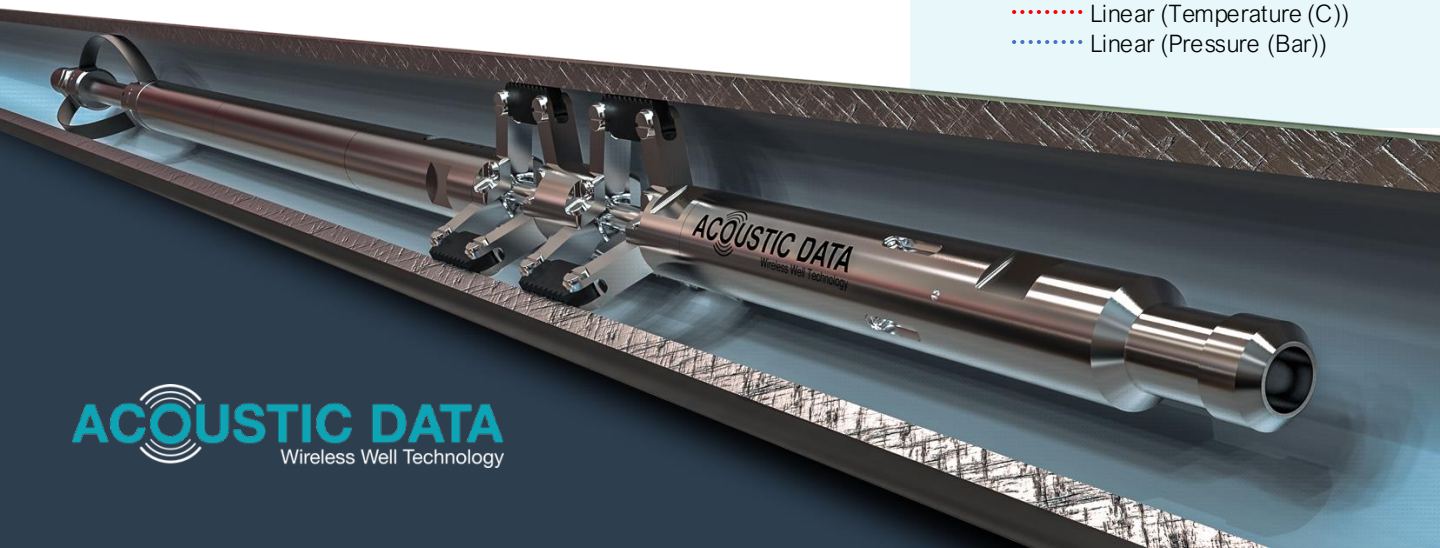
SOLUTION

- The SonicGauge Wireless Monitoring System was retrofitted via slickline in 2-3/8" tubing on Barracuda HEX-Hangers.
- The primary SonicGauge sensor was located at 1,935mMD (6,346ft), and SonicRepeater stations with onboard sensors were installed at 1,300mMD (4,264ft) and 600mMD (1,968ft).
- A SonicGauge Data Logger with 3G/4G modem was installed at surface to provide remote downhole-to-desktop data transfer.

RESULTS

- Upon installation, the SonicGauge System transmitted high-resolution and high-accuracy real-time downhole data to surface every 10 minutes.
- The data schedule then transitioned to hourly intervals to provide dynamic injection and production pressure gradients for 2.4 years, after which the system would be retrieved, redressed, and redeployed for another 2.4 years.
- The SonicGauge provided the required data to comply with regulatory reporting, significantly reducing data acquisition OPEX (memory gauge surveys) and workover costs related to installing a cabled PDG.





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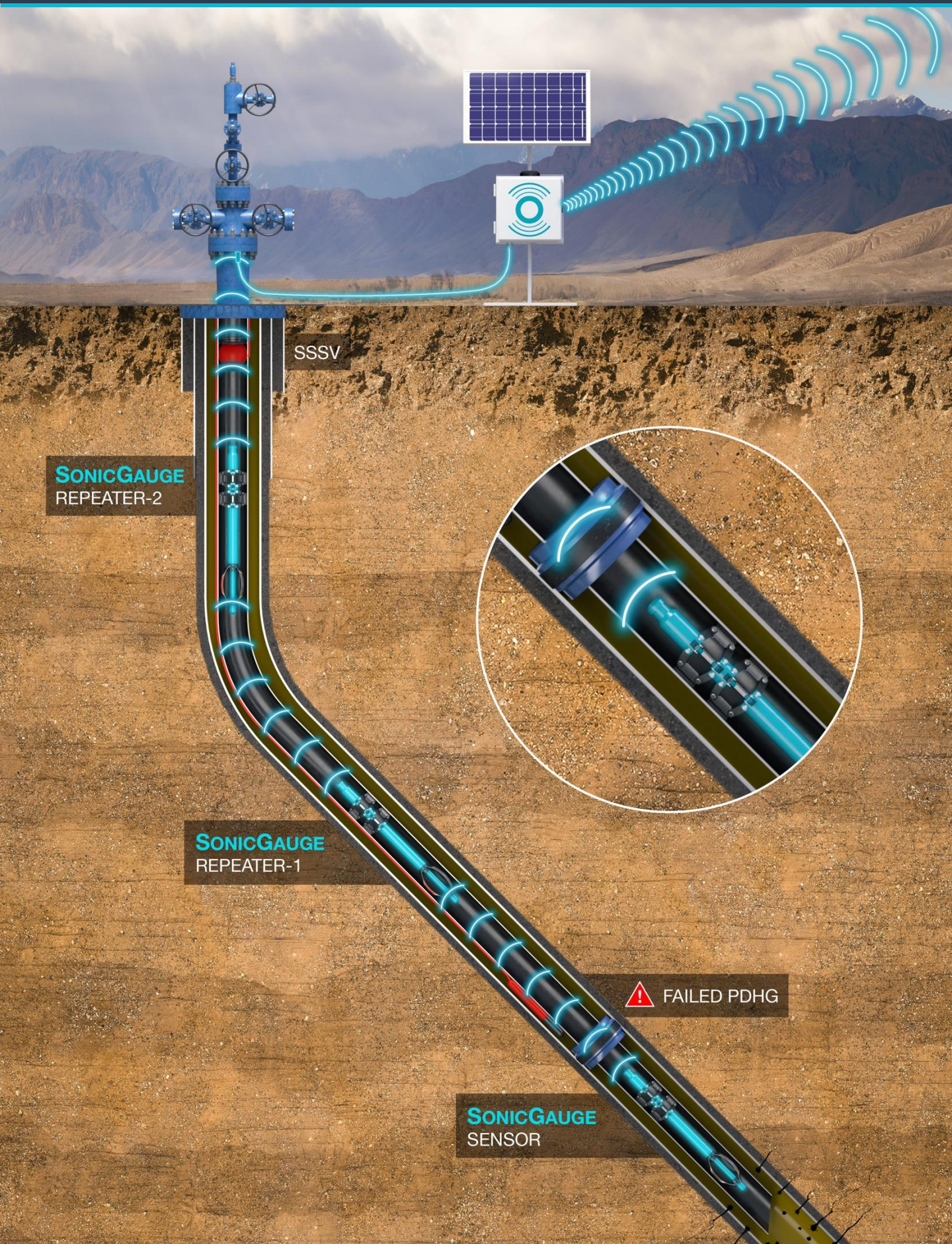
INTERFERENCE & CONNECTIVITY

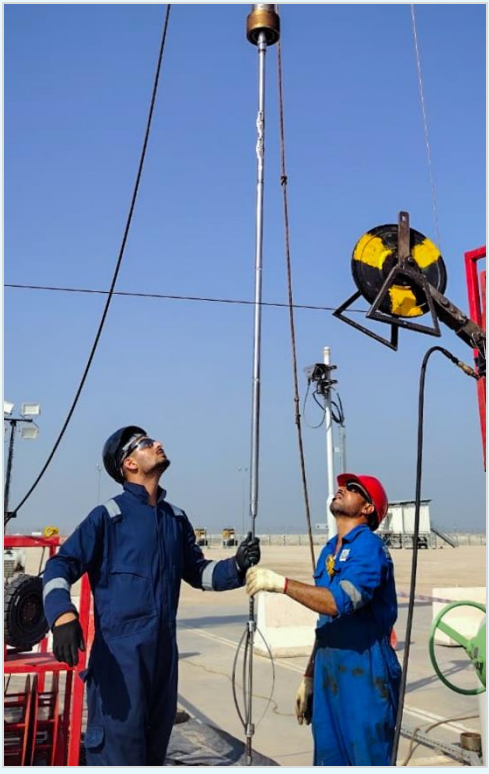


SonicGauge™
WIRELESS MONITORING SYSTEM

LOCATION: IRAQ
PARTNER: HALLIBURTON

Field-Scale Digitalisation of Brownfield Assets via Slickline

- A waterflood program was initiated in 2024 in an oilfield where the existing producing, injection and observation wells do not have real-time downhole surveillance.

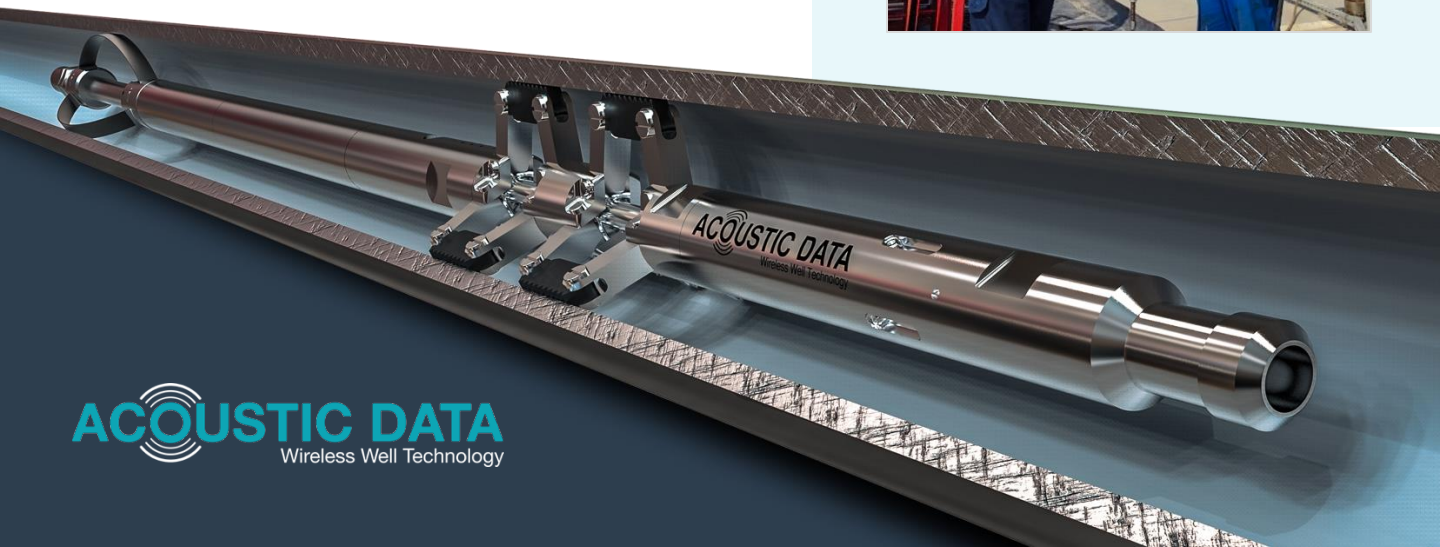


SOLUTION

- Ten observation wells were selected to monitor the impact of water injection in a 1:2, 1:3 and 1:4 injector-to-observation ratio across three reservoirs.
- Another six production wells have also been included in the project.
- Downhole tools are installed on 3-1/2”, 4-1/2” and 5-1/2” Barracuda HEX-Hangers inside the production tubing without the need for nipple profiles.
- SonicGauge Data Logger is connected with the client’s DCS, allowing the reservoir team direct access to monitor well performance from anywhere in the world.

RESULTS

- Waterflooding through four injectors of up to 20,000 bwpd per well is being monitored.
- The re-pressurisation effect will be monitored in ten observation and six producing wells of up to 8,000 bopd per well for 3+ years.
- Several observation wells include gradient monitoring functionality that is capable of monitoring fluid contact movements during injection.



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SONICGAUGE™
WIRELESS MONITORING SYSTEM

LOCATION: IRAQ
PARTNER: NESR

Interference & Observation Well Monitoring of Remote Assets

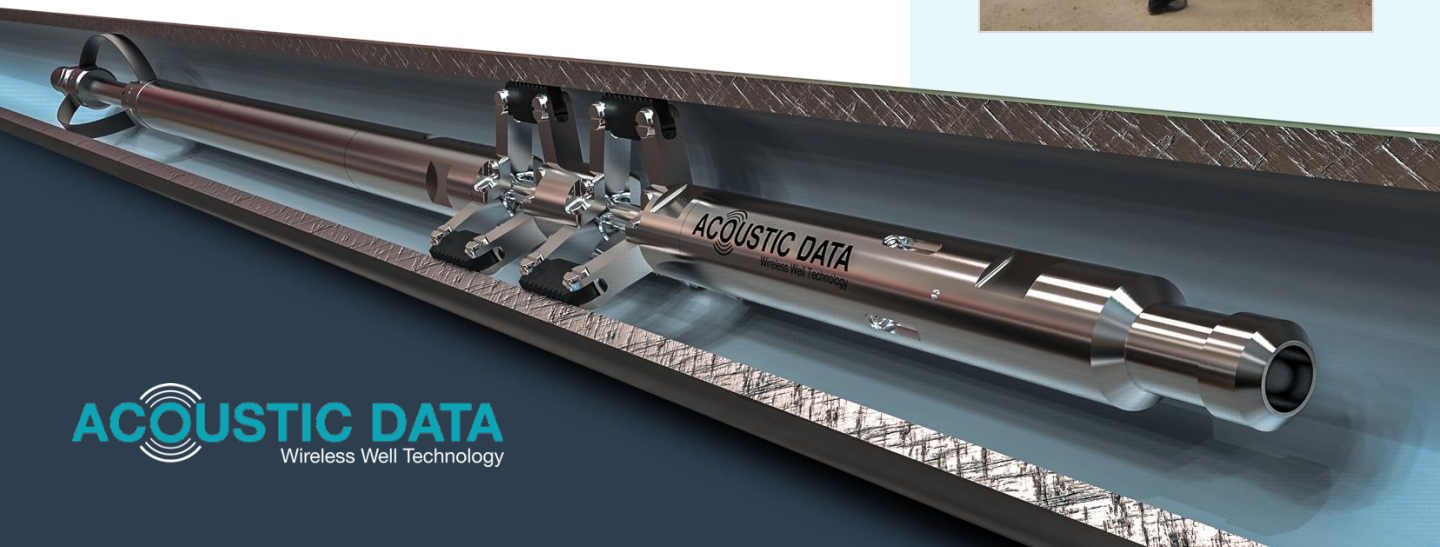
- A consortium is redeveloping a field in Southern Iraq where the benefit of waterflood has been monitored through multiple and sporadic slickline campaigns and RFTs from new wells.

SOLUTION

- Acoustic Data's engineers mobilised to Iraq to install four SonicGauge Wireless Monitoring Systems in conjunction with NESR, who deployed the technology via slickline.
- Downhole tools were installed on Barracuda HEX-Hangers that were set in 3-1/2" tubing by the Electro-SET.
- SonicGauge sensors were set at 2905mMD, 2735mMD, 2600mMD and 2400mMD, operating up to 100°C and 2500psi.
- SonicRepeater stations were selectively installed to account for production tubing attenuation and provide real-time gradient data.
- The remote nature of the field made traditional methods of data transfer impractical, so Acoustic Data installed 3G/4G modems linked to a cloud-based application to allow the reservoir team to monitor performance 24/7 from anywhere in the world.

RESULTS

- The SonicGauge reported a re-pressurisation trend of ~20psi per month resulting from the injection program.
- The real-time and long-term data showed a pressure trend inversion compared to the Static Gradient Survey data, which could not identify a recognisable pressure trend due to the short deployment durations with insufficient data capture.



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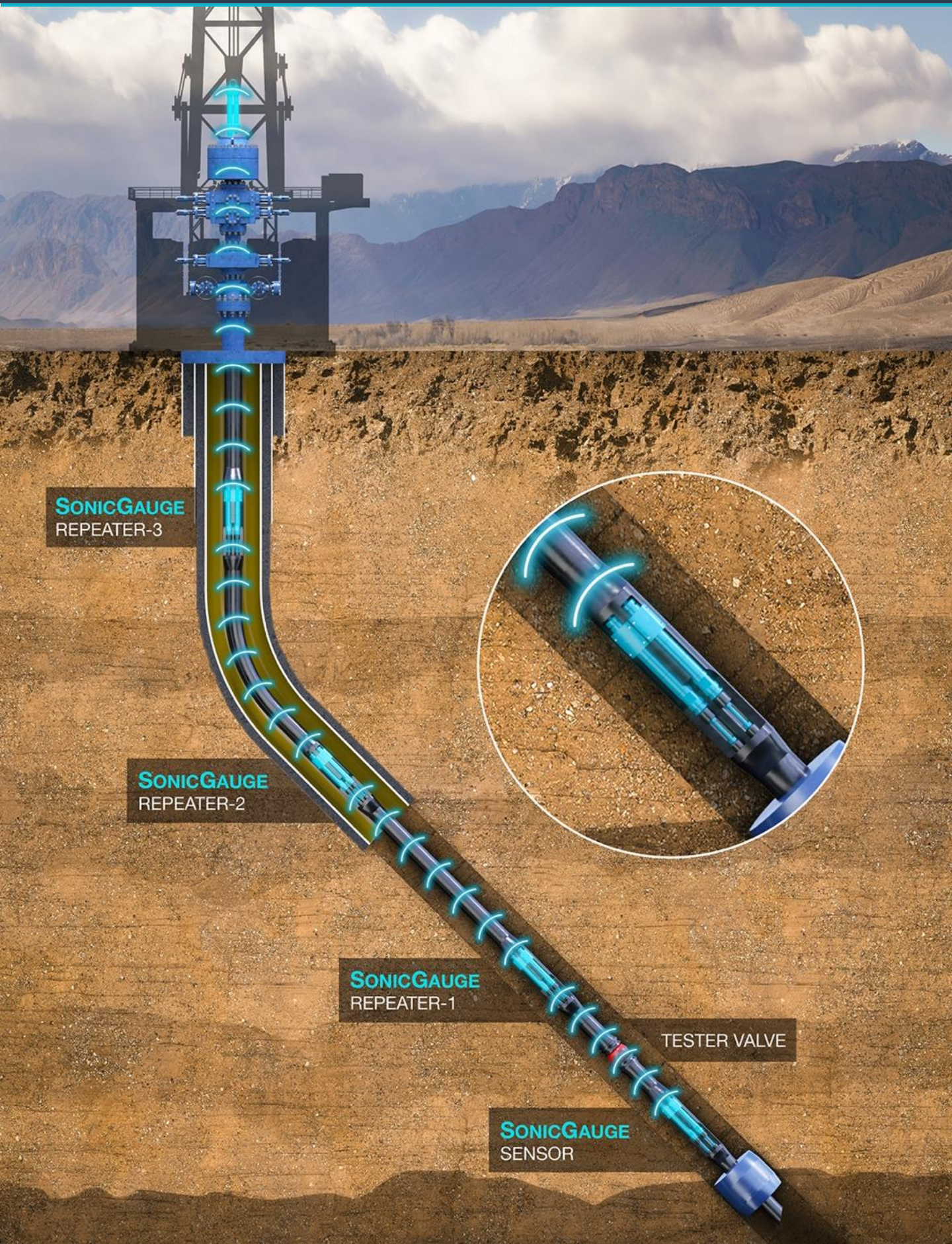
DRILL STEM TESTING | FRAC MONITORING



SONICGAUGE™
WIRELESS MONITORING SYSTEM

LOCATION: AUSTRALIA

Wireless Surface-Read-Out Data Enables Real-Time Visibility of PBU, Saving Rig Time

OVERVIEW

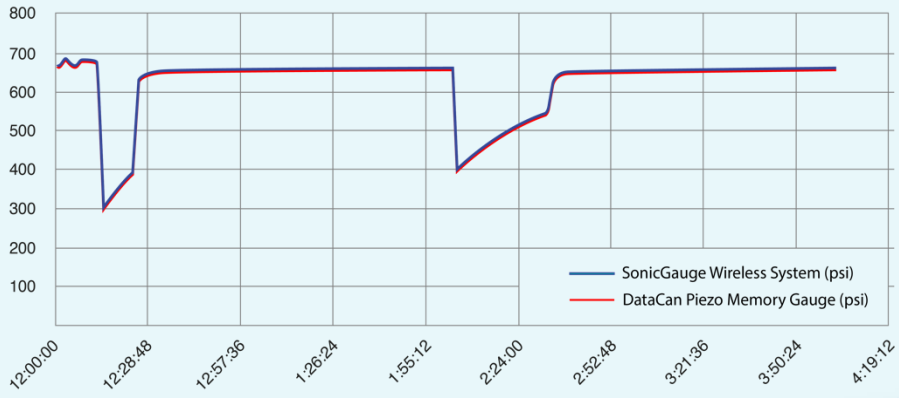
- An Australian operator requested a real-time acoustic telemetry system as other surface-read-out data acquisition technologies, such as electromagnetic, wireline or mud pulse, could not provide reliable performance for their drill stem testing operations.
- High-frequency data was required over several hours of testing to capture fast pressure build-up and drawdown responses.

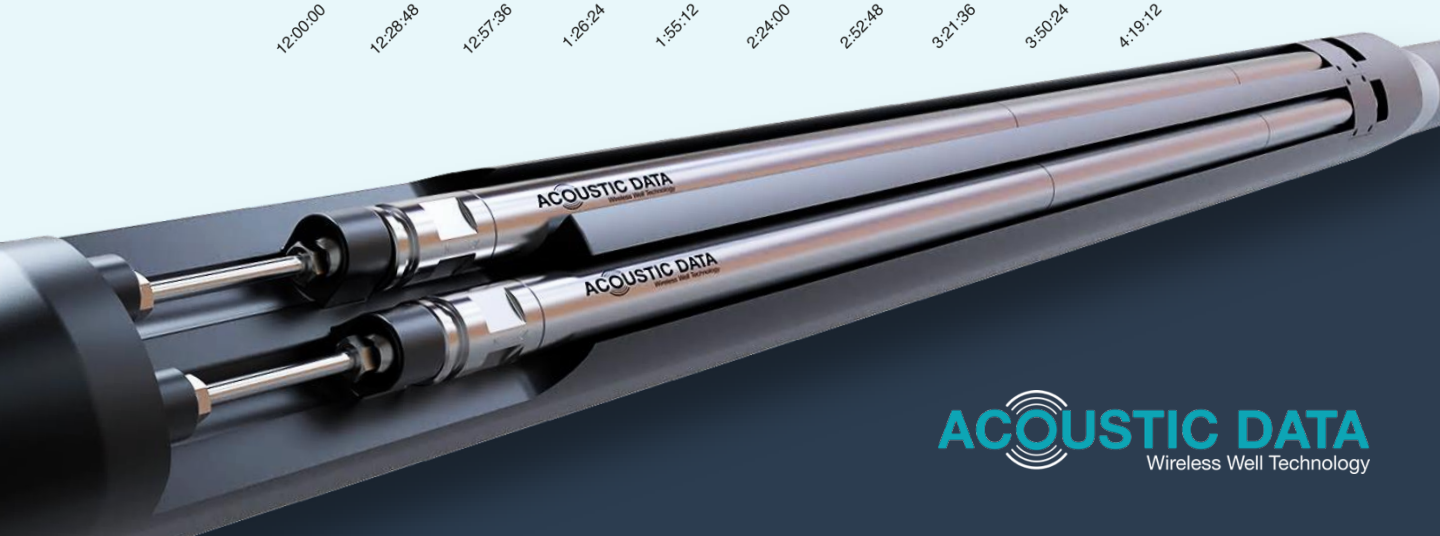
SOLUTION

- The SonicGauge Wireless Monitoring System was deployed in a drilling campaign to provide real-time surface read-out of data during shut-in and flowing conditions.
- The technology was deployed in six wells in the Surat Basin and one in the Cooper Basin.

RESULTS

- 1-minute data was recovered to surface from the SonicGauge System from depths up to 1914mMD.
- The graph below shows a perfect match of SonicGauge input against the DataCan 3/4", 6,000psi piezo gauge data that were run on the inside of the DST string.





ACOUSTIC DATA
Wireless Well Technology

SONICANALYST™
DOWNHOLE EVENT MONITOR

LOCATION: CANADA

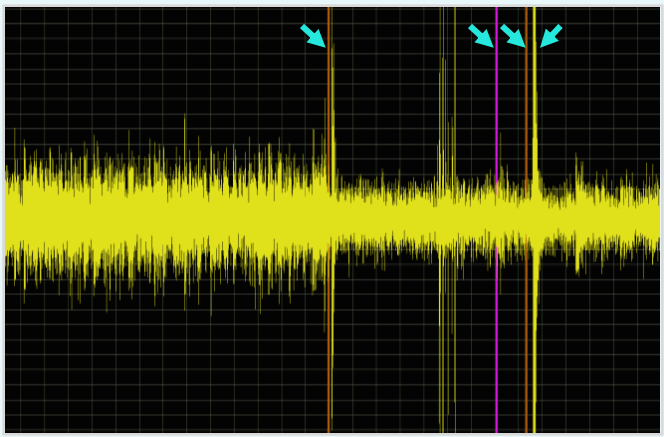
Real-Time Acoustic Monitoring at Surface Saves $300,000 in Failed Frac Costs on Critical Operation

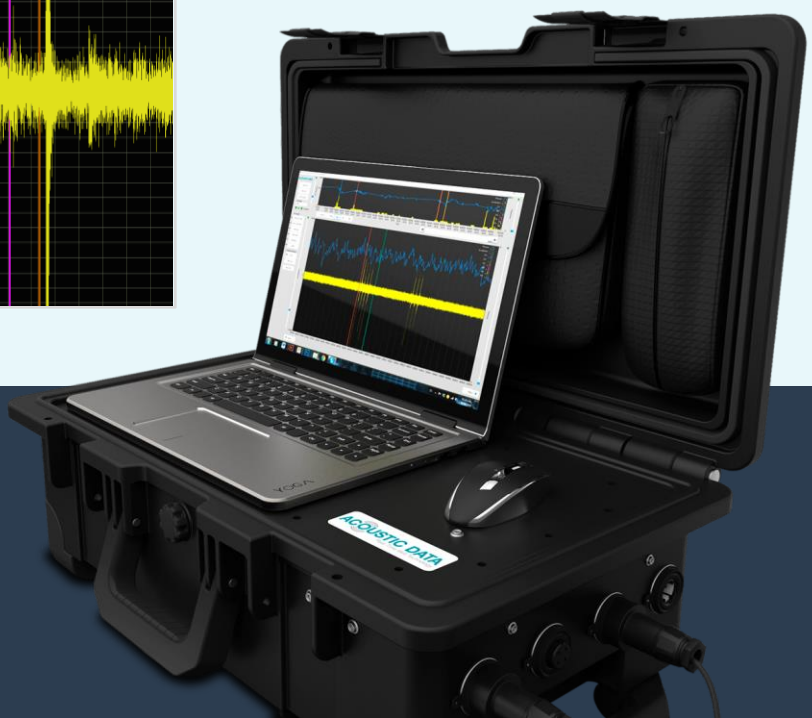
OVERVIEW

- During fracture stimulation treatments, the SonicAnalyst Downhole Event Monitor provides positive confirmation of frac ball launch and seating, movement of sliding sleeves, and changes of fluid flow noise indicating frac fluid diversion or breakthroughs.
- It provides positive confirmation and the exact time when perforation guns have been fired downhole, which is particularly useful if phased perforating timing is used.

SOLUTION & RESULTS

- During a SonicAnalyst deployment, the operator was able to identify a missed ball launch at surface that would have resulted in a sleeve not shifting and a frac not being diverted as required.
- They were able to reset the equipment and complete a successful frac after the SonicAnalyst technology had identified the fault at surface.
- The operator estimated that the information saved them US$300,000 in failed frac costs.
- Four distinct operations and their noise signals can be seen in the image below, which were identified through the SonicAnalyst monitor´s downhole noise filtering and interpretation technology.





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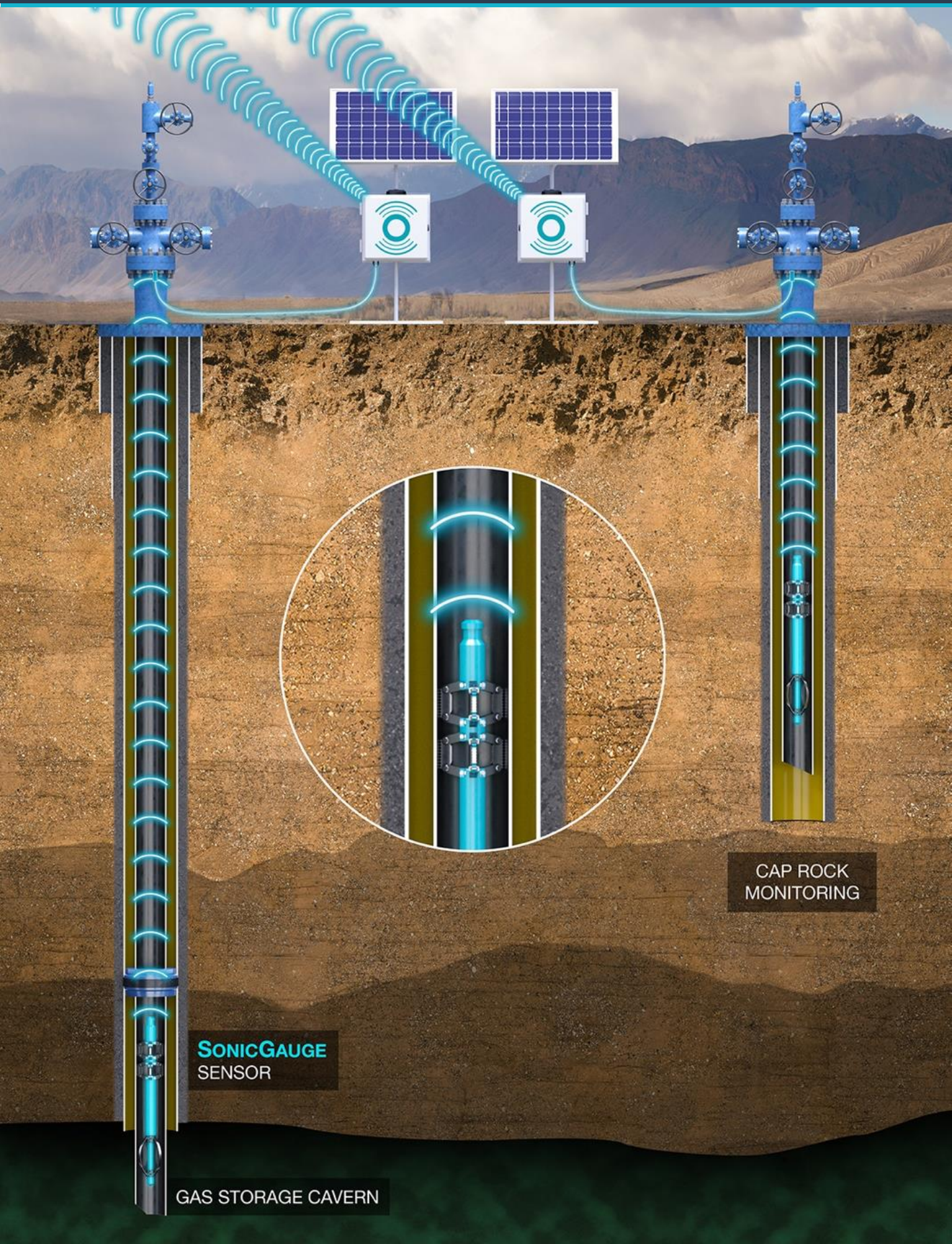
UNDERGROUND ENERGY STORAGE



SONICGAUGE™
WIRELESS MONITORING SYSTEM

LOCATION: GERMANY
PARTNER: MULTILINE

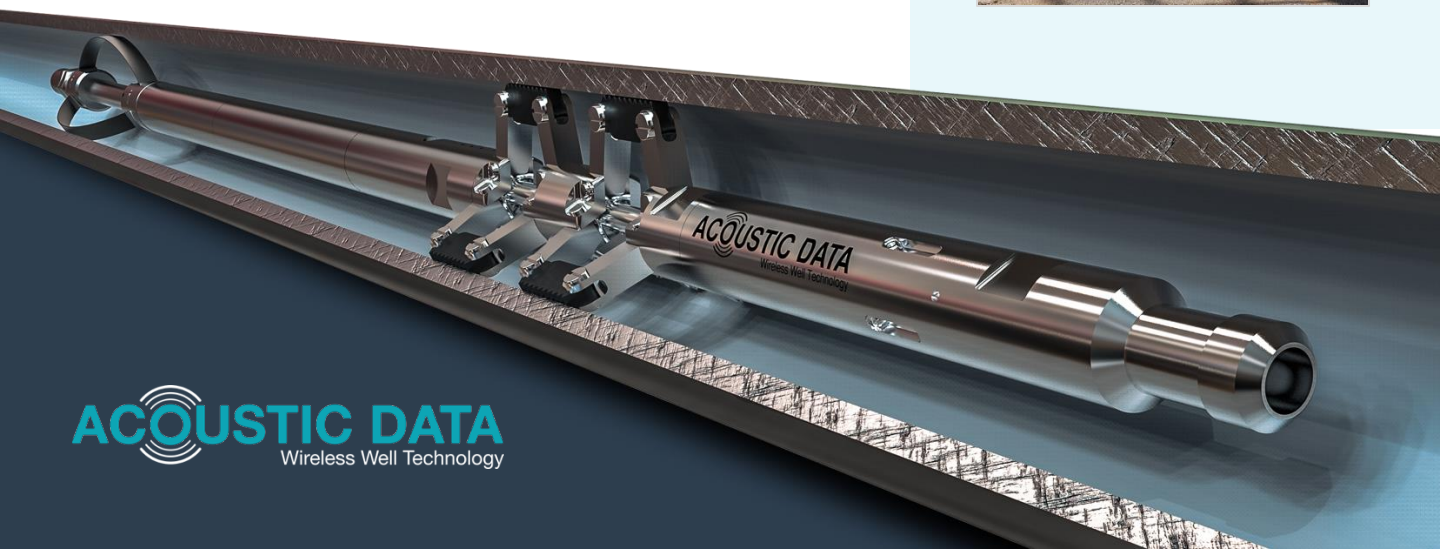
Four SonicGauge Systems Retrieved & Re-Run With Zero Lost Time or Safety Incidents

OVERVIEW

- In late 2023, a major European Gas Storage Operator wanted to retrieve and redeploy four SonicGauge Systems installed in 2020 to monitor a new set of injector/producer and observation wells as part of their periodic well maintenance program.
- Since their first installation, the wireless technology has provided continuous real-time pressure and temperature data to assist the operator in monitoring reservoir integrity and optimising production operations over a multi-year duration.

SOLUTION & RESULTS

- The retrieval operation was executed by a slickline crew from Multiline GmbH, who have partnered with Acoustic Data on multiple operations since 2019. A standard SB Pulling Tool was used to retrieve all tools without issue.
- The reinstallation operation was executed flawlessly with the Barracuda HEX-Hanger, enabling all runs to be completed well within the planned time, which allowed for additional slickline operations to be undertaken.
- The ability to retrofit the SonicGauge into any well allows deployment into existing fields, and the range of tubing sizes serviced, from 2 3/8" to 9 5/8", has enabled real-time data to be acquired in observation wells and high-rate injectors/producers.
- The flexibility of the wireless monitoring system has also allowed it to be installed beneath Multiline's Retrievable Bridge Plugs to verify the barrier's integrity during operations such as Xmas Tree changeouts.



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SONICGAUGE™

WIRELESS MONITORING SYSTEM

LOCATION: USA

Real-Time Monitoring Removes The Requirement for Memory Gauge Surveys

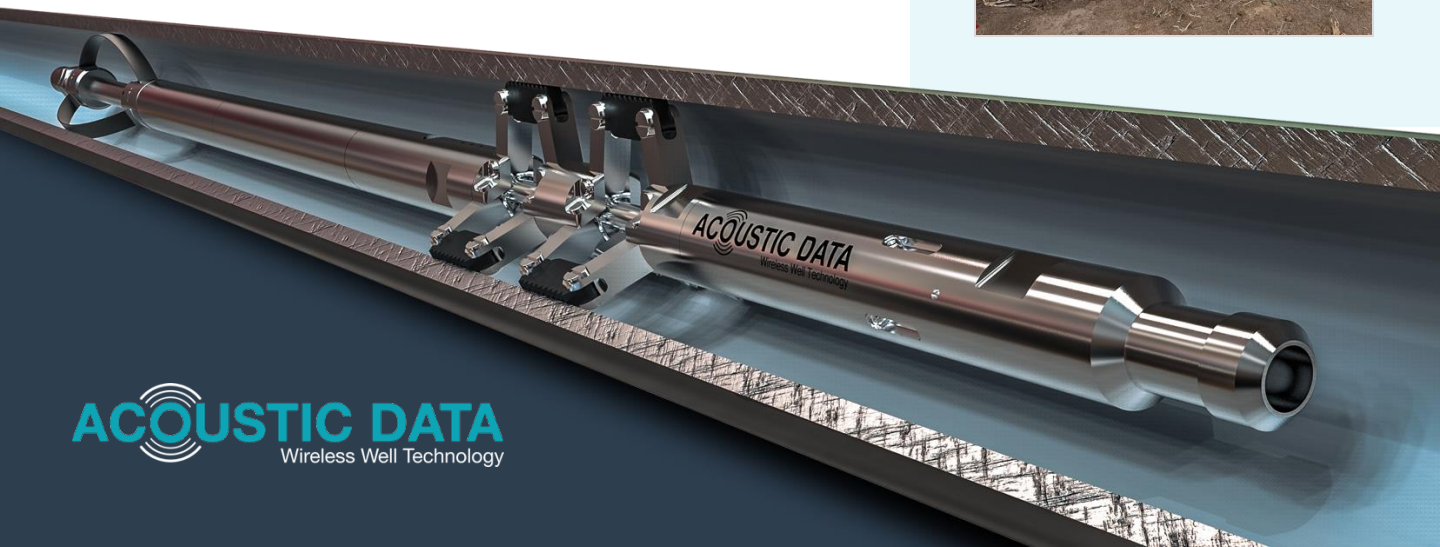
- Underground Gas Storage assets are critical to energy infrastructure in enabling energy companies to balance volatility in supply and demand.
- Operators will utilise depleted reservoirs and caverns for storage, leveraging existing infrastructure that may have been installed decades earlier. Injection and production monitoring is required to ensure cap rock integrity and optimise storage capacity.

SOLUTION

- Acoustic Data completed another SonicGauge installation for another US operator who required real-time monitoring of an asset in Kansas without incurring the cost of a workover or frequent slickline operations required for memory gauge surveys.
- The 2-3/8” tubing utilised in the well also required a solution where all downhole equipment, including settings tools for the high expansion gauge hanger, could easily pass through a 1.9” restriction.

RESULTS

- The SonicGauge was selected on the basis of its ease of deployment, integration into existing wellsite communication systems, and exceptional power management, enabling gauges to deliver high-frequency data for a 5-year deployment duration.
- The small cross-sectional area (best-in-class) makes the SonicGauge the ideal choice for applications where space is limited or where traditional solutions cannot be deployed.



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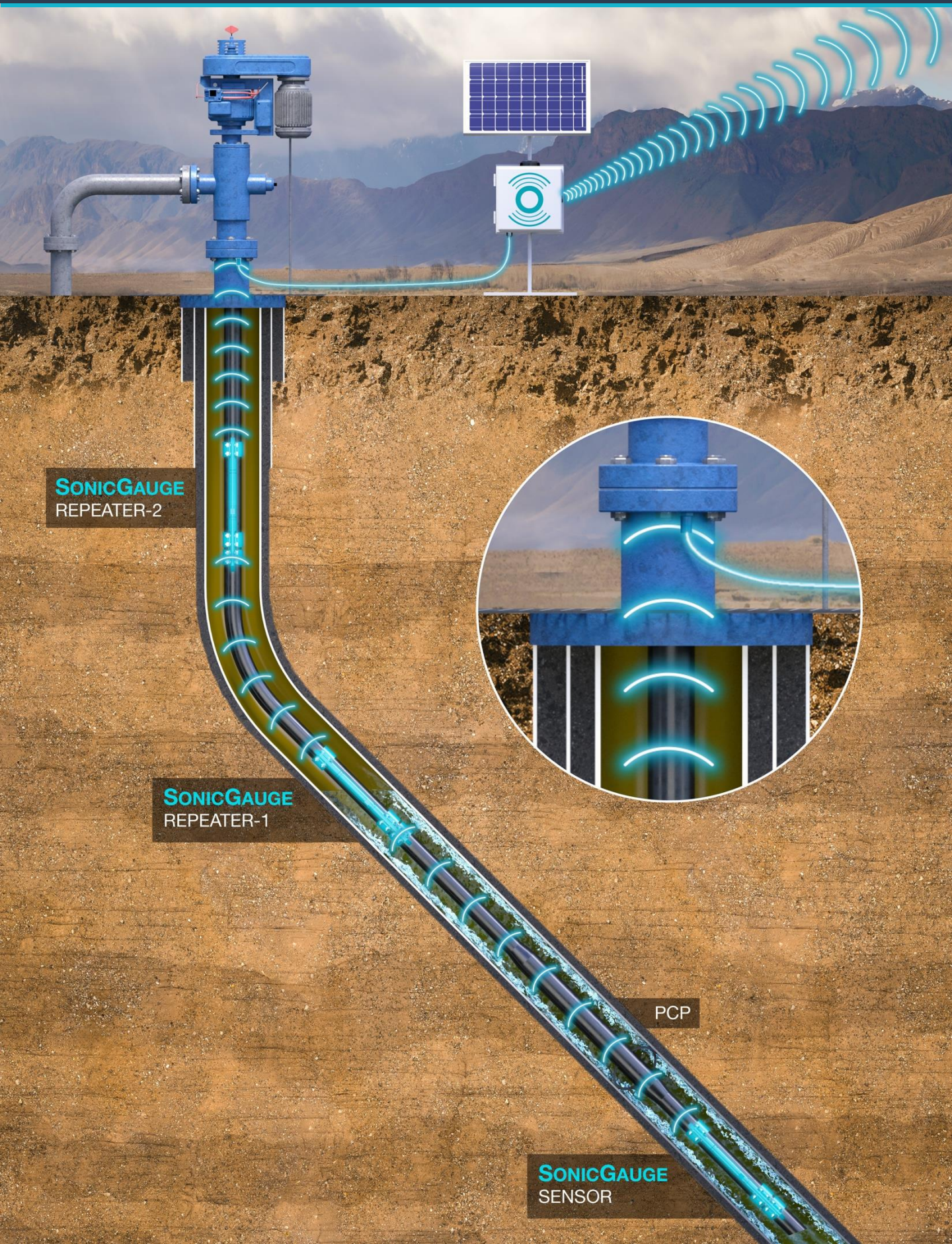
ARTIFICIAL LIFT MONITORING



SONICGAUGE™
WIRELESS MONITORING SYSTEM

LOCATION: AUSTRALIA

Low-Profile Technology Enables Real-Time Monitoring of PCPs in CSG (Snubbing Unit Deployed)

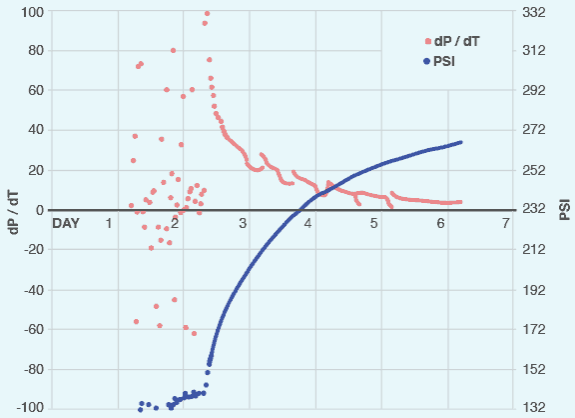
- Real-time annulus fluid level data was required in two PCP wells for approximately one year to ensure the wells were not pumped off and to capture pressure build-up data between pumping cycles.
- The client required a cost-effective, cable-free solution that didn't require any modifications to the wellhead and could be deployed using a snubbing unit on a live well.

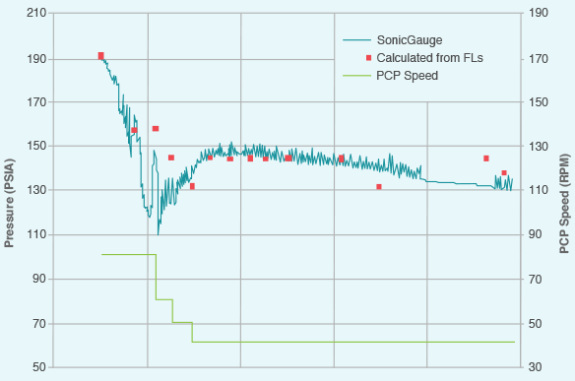
SOLUTION

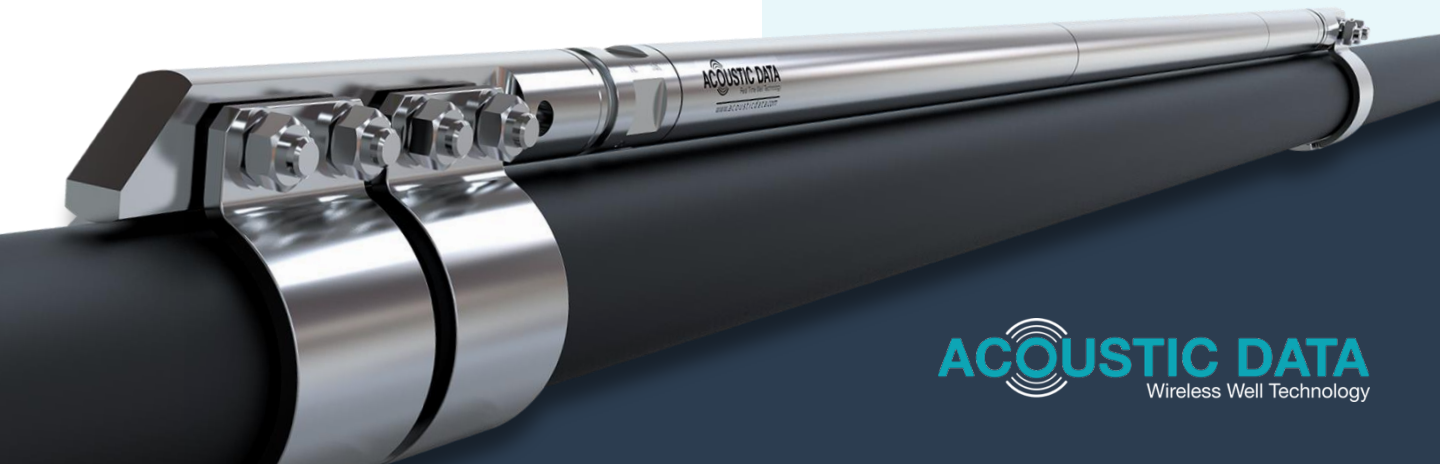
- A local Acoustic Data engineer installed the SonicGauge offline on external clamps before the tubing was run, saving significant rig time.
- In one well, a single SonicGauge was installed at 239mMD, and in the other well at 316mMD—both were located directly underneath the PCPs.

RESULTS

- The two SonicGauge Systems operated without fault for their entire deployments.
- The hourly frequency of data acquisition allowed the operator to accurately monitor the 'real' dynamic fluid head over the PCP during the dewatering phase and to capture early well pressure build-up parameters.
- The graph to the right compares consistent wellbore pressure provided by the SonicGauge against the 'scattered' and low-frequency wellbore pressure data estimated by echo-meter shots.







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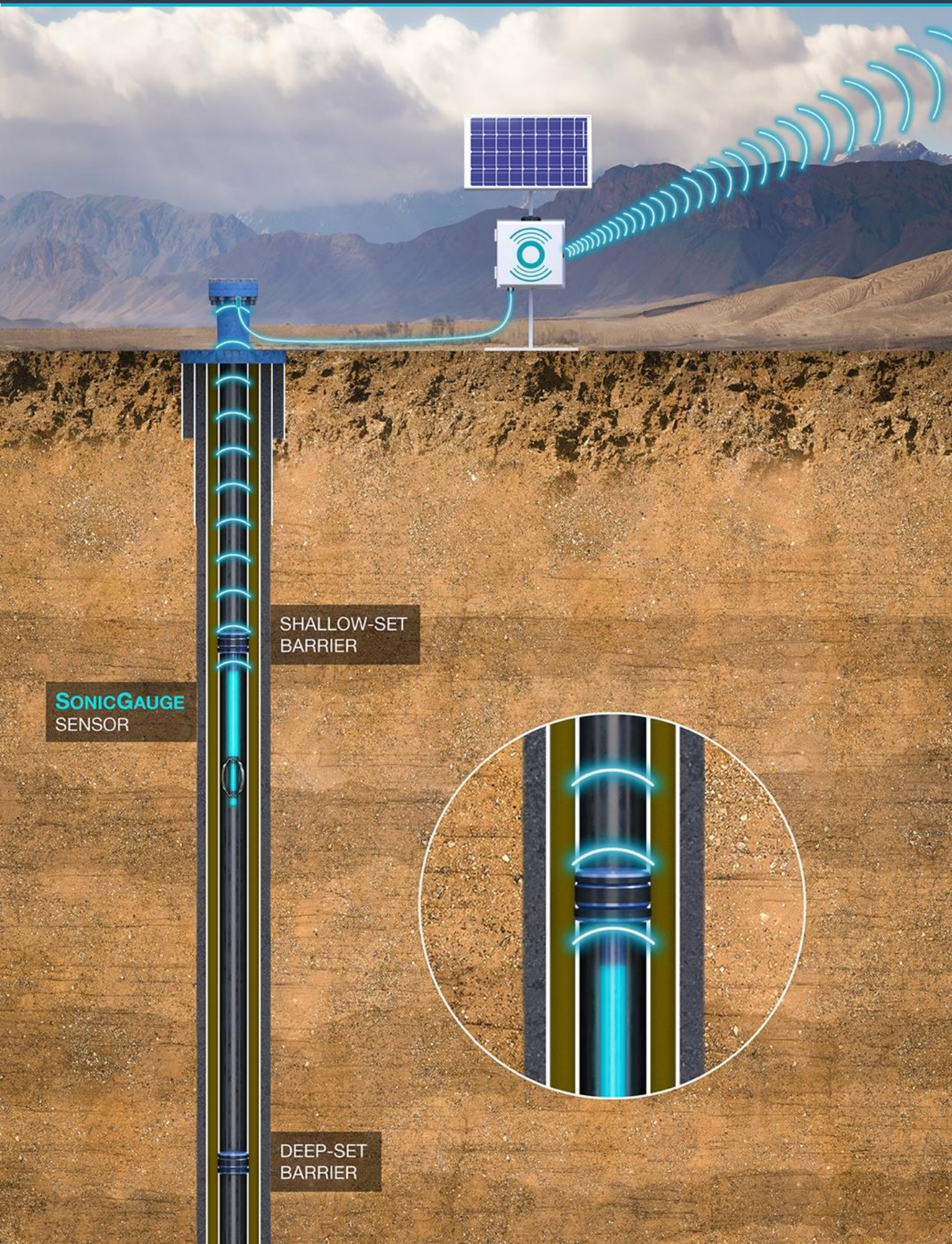
BARRIER VERIFICATION



SONICGAUGE™
BARRIER VERIFICATION SYSTEM

LOCATION: GERMANY
PARTNER: MULTILINE

Real-Time Assurance of Barrier Integrity on Safety Critical Operations

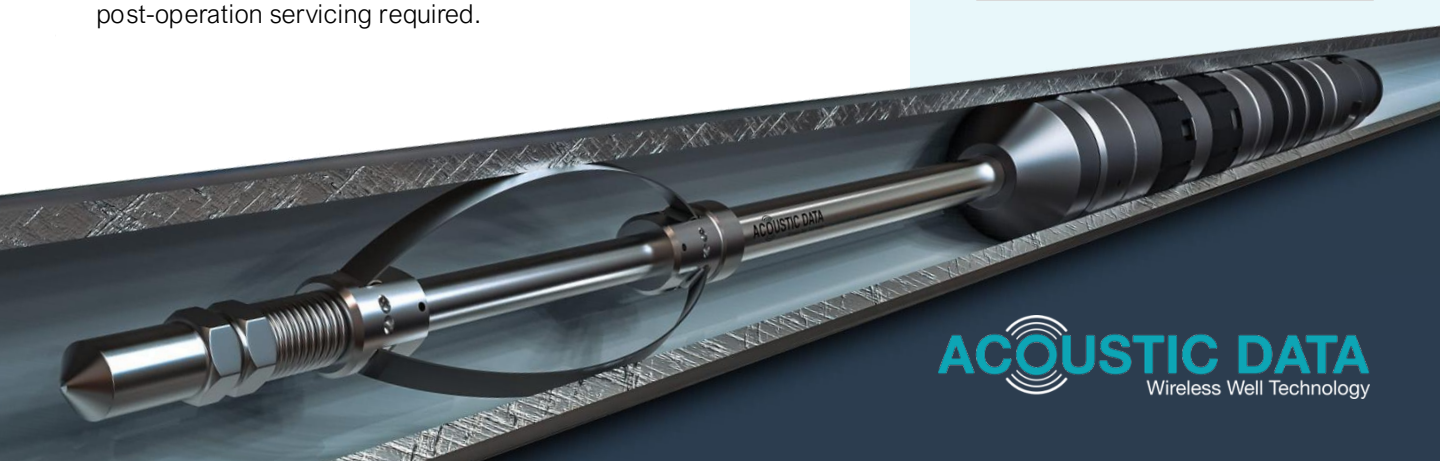
- All intervention operations present hazards; however, operations in salt caverns utilised for Underground Gas Storage present additional challenges due to the inability to utilise many traditional well control measures if containment is lost.
- In a recent operation to replace a seal between the wellhead and the Xmas Tree, a European operator needed to ensure that the barrier provided by two wireline retrievable bridge plugs was maintained throughout the operation.
- Any degradation in the performance of the plugs would need to be immediately detected to permit the intervention team to take remedial actions.

SOLUTION

- Acoustic Data's engineers installed a SonicGauge System, enabling real-time monitoring of the integrity of downhole barriers.
- The SonicGauge transmitted data every 2 minutes, allowing the surface data logger to continuously monitor BHP and activate user-defined alarms in the event of any variations in downhole conditions.
- The technology can be configured for short- or long-duration deployments, from a few hours to several years, leveraging our expertise in wireless downhole monitoring of critical assets.
- The SonicGauge can be deployed as part of the plug assembly, independently on the Barracuda™ HEX-Hanger or integrated into components such as wash pipes to allow the continuous monitoring of any downhole completion.

RESULTS

- The intervention team were able to execute the operation with the assurance that the subsurface barriers were holding pressure throughout the seal changeout.
- The SonicGauge was retrieved at the end of the operation, redressed and redeployed onto its next operation, demonstrating the minimal post-operation servicing required.



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