

Barnett Shale Operations Achieve Remote Real-Time Microseismic Interpretation with Private and Dedicated Wireless Networks

Case study: Expediting field operations and improving collaboration for accurate decision making

Challenge

Optimize remote processing and collaborative interpretation of microseismic data acquired and transmitted from wellsite to office. Access very large seismic datasets in real time and provide mapped microseismic locations for display at both the wellsite and remote sites.

Solution

Use the InterACT* connectivity, collaboration, and information system; StimMAP LIVE* real-time microseismic fracture monitoring, in conjunction with Petrel* seismic-to-simulation software; and IPerformer* Wireless Broadband service, a WiMAX-based terrestrial radio network with 1,700-bps circuitry for high-volume, high-speed, low-latency data transmission.

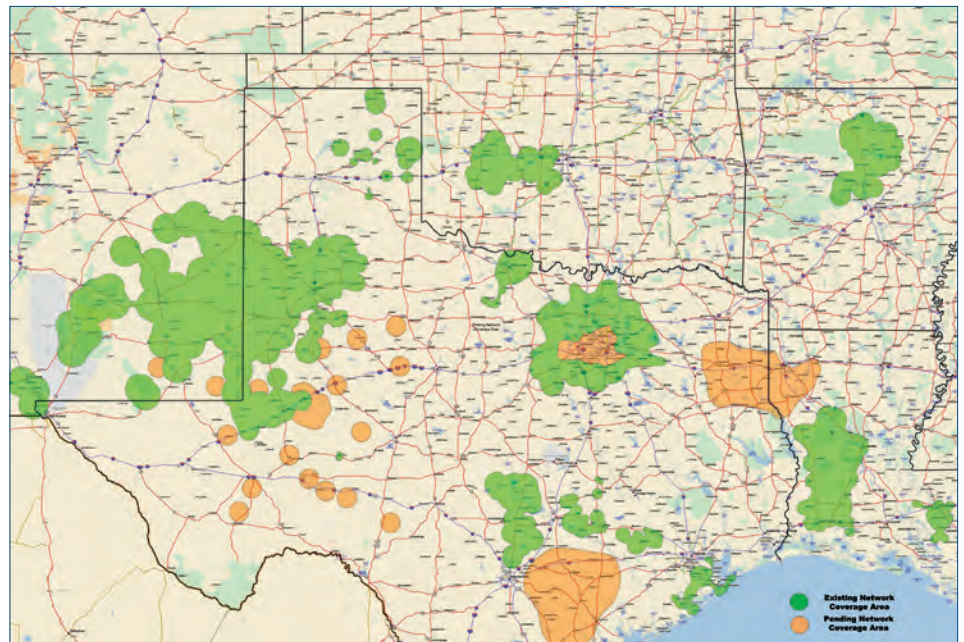
Results

Improved decision making by instantaneously communicating field operations data to the corporate office. Delivered cost-effective, consistent, and high-quality connectivity (100% uptime and less than a 60-ms delay).

Inefficient microseismic data transmission

In the Barnett Shale, the largest natural gas play in Texas, hydraulic fracture monitoring (HFM) services are often used to map ongoing treatments. Operators needed more efficient office support of critical decisions, so a new method was sought to improve transmission speed of high volumes of microseismic data for real-time processing and interpretation.

Processing data remotely would improve overall efficiency, minimize safety risks, and provide access to high-power computer systems not available in the field. Remote transmission of full seismic data waveforms (not just triggered events) was key to reaching this goal. The main difficulty was that seismic datasets could exceed 5 GB, causing throughput and delay issues that traditional data transmission methods could not always handle. The new method had to provide microseismic event data to decision makers on location or in the office within 30 seconds of detection.



IPerformer wireless network coverage areas as of the fourth quarter of 2009 are shown in green. Additional coverage areas are planned.

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Combination of services for a pilot well

Schlumberger Data & Consulting Services (DCS) and Schlumberger Information Solutions (SIS) collaborated on HFM requirements. A combination of StimMAP LIVE, Petrel, IPerformer, and InterACT technologies was first applied to a pilot well to test mobilization, setup, and performance.

StimMAP LIVE diagnostic services were run by DCS to monitor microseismic fractures in real time as they were created. Used with SIS Petrel software, this service enabled operators to visualize fracture development and make real-time treatment adjustments to optimize job effectiveness.

Partnered with ERF Wireless, Inc., SIS also delivered a high-capacity broadband service to the Barnett operators. This included IPerformer connectivity—a 1,700-bps, WiMAX-based terrestrial radio circuit positioned alongside the standard VSAT service. Designed for oil and gas business applications, the IPerformer service ensured high performance, reliability, and security for transmitting full waveform data.

The solution also offered low latency, with less than a 60-ms delay, no contention (1,700 bps unshared), and 100% reliability. Both onsite and remote geophysicists could access ongoing jobs in real time through a continuous feed from the field via the Internet and the Schlumberger InterACT Web server, employing secure encryption. Network statistics recorded over a 24-hour period during pilot well testing indicated

- uptime of 100%
- upload bandwidth speeds of 1,700+ bps
- download bandwidth speeds of 1,700+ bps
- average upload speed of 468 KBps
- average latency of 20 ms or less.

Collaborative seismic interpretation

The pilot showed that collaborative seismic interpretation could be accomplished remotely with minimal processing and visualization delay, bringing field operations to operation support center experts in real time. The wireless broadband service enabled the WiMAX network to achieve 100% uptime with negligible packet retransmissions. Wellsite and remote staff indicated that where high data rates are expected, this communication service performs significantly better than using VSAT communications alone. Due to the pilot's success, this solution will be expanded to other operations within the communications coverage area of Texas and surrounding states.

Schlumberger Information Solutions

Schlumberger Information Solutions (SIS) is an operating unit of Schlumberger that provides software, information management, IT, and related services. SIS collaborates closely with oil and gas companies to solve today's tough reservoir challenges with an open business approach and comprehensive solution deployment. Through our technologies and services, oil and gas companies empower their people to improve business performance by reducing exploration and development risk and optimizing operational efficiencies.

E-mail sisinfo@slb.com or contact your local Schlumberger representative to learn more.

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