

# Best Well in the Province

## A full-wave solution helps Sinopec optimize its drilling program for a fractured gas reservoir

■ In August 2007, we delivered our final images of the XinChang reservoir, along with our interpretation of the 'sweet spots' (areas that should prove most productive if penetrated by new wells). We are pleased to report that the project has been a tremendous success. Sinopec was able to drill three new producing wells, including one that tested as the most prolific in an area that accounts for 40% of Sinopec's domestic production. The Chinese media declared this discovery "a result of world-class seismic technology in a tough exploration area." Sinopec is just getting started, with another 16 wells to be drilled in the months ahead and the upcoming launch of our second full-scope imaging project.

■ To recap a bit of history, ION began discussions in 2003 with an operating subsidiary of Sinopec – Southwest Petroleum Branch (SWPB) – about applying full-wave seismic to optimize a drilling program planned for this tight gas reservoir. Traditional seismic methods had generated satisfactory images of the structural geology at XinChang; however, they were insufficient for truly characterizing the reservoir's lithology (rock type) variations and the fracture network that Sinopec's

geoscientists knew were the primary determinants of individual well production.

■ As the second largest producer of natural gas in China, Sinopec was under tremendous pressure in 2003 to increase domestic production. The SWPB geoscience team and senior leadership group believed the application of the latest E&P technologies would give them the best chance to satisfy the objectives of their key stakeholders. Full-wave seismic became an integral part of their technology program.

■ ION and SWPB geophysicists modeled the improvements that full-wave imaging techniques could provide. The joint team determined that full-wave seismic would improve the quality of the recorded data and deliver insights into both lithology and fracture patterns within the reservoir intervals. Acquisition began in October 2004 with 6,000 VectorSeis sensors and a field acquisition crew consisting of 1,466 people and 133 vehicles. The survey size, amount of data acquired, and scale of the field operation made XinChang the largest full-wave project ever undertaken.

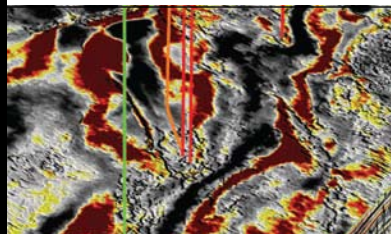
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■ In 2006, ION's GXT Imaging Solutions group was awarded the data processing and reservoir analysis contract. We had been investing heavily in the algorithms and infrastructure to process full-wave data, but the scope and complexity of the project challenged even our capabilities. We worked in close collaboration with the geoscientists and engineers from SWPB and, in 2007, a clearer picture began to emerge. We were able to extract attributes from the seismic data that explained broad regional stress fields and the impact these tectonic forces have on the reservoir fracture patterns at XinChang. By integrating well data from cores, logs, and production histories, the ION team was able to characterize reservoir properties and propose the optimal locations for new wells.

■ While the chapter could have been closed in August 2007 when the XinChang results were delivered, our collaboration with Sinopec continues. Just before the close of the year, Sinopec commissioned a high-station count, VectorSeis-enabled full-wave survey to characterize a nearby reservoir, and plans to use the same team to process and interpret the results. We look forward to answering the bell for Round II.

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