

# Scientific advances behind massive gas find

## Breakthrough in 3D seismic technology gave Shell ability to see hidden reservoir

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Calgary — For decades, what lies beneath the limestone shelf deep below the eastern edge of the Rocky Mountains has been a mystery to energy companies, left to guess what kind of energy riches might be trapped underneath in the ancient coral.

The sound waves used to map oil and natural gas reservoirs kilometers below the earth's surface simply could not make their way through the folds of the mountain range and the limestone. "It just bounces right up and you couldn't see below it," says Greg Stringham, vice-president at the Canadian Association of Petroleum Producers.

No more. Advances in three-dimensional seismic technology have allowed Shell Canada Ltd. to penetrate that sound barrier, giving it the tools to pinpoint the massive natural gas discovery it announced last week. Shell found as much as 800 billion cubic feet of raw gas, the most expansive measure, in the Foothills about 160 kilometers northwest of Calgary.

Along with the lure of higher gas prices, the industry — or at least those that can match Shell's technology — now have the "will and the way" to peer into untapped reservoirs, which typically sit as far as five kilometers underground, Mr. Stringham said.

Shell does not want to talk in detail about its breakthrough, for fear of giving away its competitive edge, but the company did say its innovation centers on the interpretation of seismic data. Such data start out as sound waves, but can be assembled into 3D models using powerful computer programs and the expert interpretative skills of petroleum engineers.

Shell spokeswoman Jan Rowley likened the situation to someone being able to look past the electronic snow obscuring a television picture, and figuring out what program was on.

The improvement has allowed Shell to avoid the "soap opera" of its last similar effort, which was plagued by high costs, missed targets and paltry discoveries, said Wilf Gobert, vice-chairman of Peters & Co. Ltd.

The rugged Foothills in Canada extend from southwestern Alberta outside Waterton Lakes National Park through northeastern British Columbia. Wells already dot the Foothills, but the

prospect of big finds at deeper levels is getting people excited as other players also ride advances in 3D seismic technology.

“The Foothills is where it's at for big new discoveries,” Jim Buckee, president and chief executive officer of Talisman Energy Inc., wrote in an e-mail.

Talisman is known for its international operations but the Calgary company's attention to its own backyard is increasing substantially. In October, Talisman announced a big success at its Monkman play in the B.C. Foothills, where it is already the dominant player, a place where deep wells can cost as much as \$15-million to drill.

The latest Monkman well could have more than 200 billion cubic feet of gas in place and Mr. Buckee said there is clear potential for “many more” such hits, predicting there could be several trillion cubic feet of gas in the surrounding area. That would easily outstrip Shell's discovery.

“If we find one more deep Monkman, we win,” Mr. Buckee wrote.

Canada's largest producer, EnCana Corp., takes a different approach, what it calls unconventional exploration. Such “resource plays” need hundreds of wells to draw out significant amounts of gas.

One example is Cutbank Ridge, an area that straddles the Foothills of B.C. and Alberta.

In an October regulatory filing, EnCana said it has had 33 successful wells in 34 attempts at Cutbank, drilled to roughly half the depth of what Shell and Talisman are doing.

EnCana said it could drill 1,800 wells in total, recovering as much as 10 trillion cubic feet of gas — more than 20 times the gas Shell will probably recover from its discovery.

“We do plenty of exploration,” EnCana spokesman Alan Boras said. “We look for very large discoveries of an unconventional nature.”

On the Alberta side of the Foothills, according to Tristone Capital Inc., Shell Canada was the No. 1 producer at the end of 2003, with 554 million cubic feet a day of gas. In the B.C. Foothills, which has seen far less development, Talisman was first at the end of 2003, with 181 million cubic feet of daily gas production.

Not all companies are excited. Imperial Oil Ltd. has land in the Foothills, but the company is concentrating on lower-risk drilling near existing production.\_\_\_\_