

# Daily Oil Bulletin

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## GSC Revisits Southern Alberta Devonian In Light Of New Technology, Rekindled Interest



BY [PAT ROCHE \(/AUTHOR/PAT-ROCHE/\)](#) – DEC. 11, 2014 – [VIEW ISSUE \(/HEADLINES/2014-12-11\)](#)

Could the next big Devonian resource play be hiding in southern Alberta?

It's not exactly tie-in time, but the **Geological Survey of Canada** (GSC) isn't ruling out the possibility there might be something there.

About 46 million bbls of oil have been produced from the younger, shallower Nisku formation at Enchant in southern Alberta.

And more to the point, in this decade **DeeThree Exploration Ltd.** made a lucrative light oil discovery in the Exshaw formation, also called the Alberta Bakken, at Ferguson. The Exshaw has been described as late Devonian to early Mississippian, straddling the Devonian-Carboniferous boundary.

“That’s obviously something that one company has been very successful at. The question remains whether or not that success can be repeated elsewhere,” said **Andy Mort**, a geochemist and a research scientist at the GSC in Calgary.

While this discovery was a company maker for DeeThree, the question is whether southern Alberta could yield a laterally extensive unconventional accumulation comparable to the emerging Duvernay play of northwest and central Alberta.

The Devonian in southern Alberta has many porous and permeable reservoirs, but few known major hydrocarbon accumulations and limited exploration drilling. According to the GSC, one of the major perceived risks with this stacked carbonate-dominated system is source rock presence, quality and maturity.

Past exploration has revealed source rocks and hydrocarbons generated in the Elk Point Group, Beaverhill Lake, Nisku and Exshaw/Lower Banff formations of southern Alberta, the GSC says.

As well, there is associated hydrocarbon production in the Winnipegosis, Nisku and the Lower Banff to Big Valley. There are also numerous documented oil shows and staining in the Cooking Lake, Leduc and Beaverhill Lake — but with little to no production.

In the conventional era, these observed hydrocarbon indicators in southern Alberta didn’t generate much interest. Breakthroughs in horizontal horizontal drilling and multi-stage completions sparked significant interest a few years ago. That quickly waned when only DeeThree was successful.

However, the GSC and industry partners have revisited some of the results and did additional organic geochemical analysis on new samples to tackle some of the outstanding questions.

While the work continues, Mort said the results have cast new light on relationships between the Nisku oils sub-families and have allowed some of the disconnects between these sub-families to be resolved.

According to the GSC, geochemical analysis of extracts from cores in the Beaverhill Lake and Elk Point Group in the study area suggest that evaporitic middle Devonian source rocks whose identity remains somewhat ambiguous are responsible for the observed shows of migrated hydrocarbons in the intervals studied.

Mort presented the findings at a **Canadian Society for Unconventional Resources (CSUR)** technical luncheon on Wednesday. His PowerPoint slides are expected to eventually appear on the CSUR website once various permissions are obtained.

The presentation, prepared with industry co-authors, was a synthesis of existing data and new information, and is an evaluation of the remaining exploration potential of the Devonian of southern Alberta.

“Just to sum up, we’ve got source rocks, we’ve got indications of source-rock prospectivity,” Mort told the well-attended event.

“We’re not sure how spatially extensive that is because well control isn’t great. There are other factors, such as the type of organic matter, which could have implication for the temperature at which generation is going to occur,” he continued.

Mort said the existing field at Enchant could have implications for unconventional prospectivity elsewhere in southern Alberta.

Also, a drillstem test at Del Bonita and a small field to the north indicated there is potential in the Winnipegosis and the Beaverhill Lake.

“The problem with these evaporite carbonate systems is that they’re easy to identify from their geochemical signature, but that doesn’t say anything about the spatial extent of them,” he said.

Showing one slide, he said: “So here you see an excellent section in a core — 25 metres and TOCs up to 10 per cent — [but] because of the nature of deposition in such a restricted environment, it’s hard to extrapolate that spatially.... So that’s one major area of uncertainty.”

The other big area of uncertainty is maturity.

“We are constrained by maturity. And it’s not a simple case of just going down dip because we know that in areas which I thought were probably going to be immature, we’ve got very good production,” Mort said. “Potentially there are maturity anomalies which are contributing to prospectivity.”

He added: “Whether we’re considering hydrocarbons that are self-sourced in place, or may have migrated up, the maturity is going to be one of the things that is a fundamental control.”

In an interview, Mort said the GSC has a research program that is looking at all aspects of characterization of unconventional reservoirs. “And one of the elements of that is looking at areas which may have been dismissed earlier.”

Southern Alberta was an obvious choice, he said, because of its accessibility. “We know there’s been historically a long tradition of oil exploration. And we were just trying to look at some of the scientific evidence to suggest that maybe there are things that have been missed.

“Coming from the GSC, our interest is really in whether or not there’s a bit more to the story of the petroleum systems that we can extend from a conventional into this new era of unconventional.”

In his presentation, Mort said: “The most recent interesting development [occurred] at Ferguson, and that’s the Alberta Bakken ... potentially related to that maturity anomaly that I alluded to, but I’m not going to commit myself. I’d rather do a little bit more study.

“But it’s an undeniable fact that we’ve got good oil and good production rates from the Alberta Bakken at Ferguson. And that’s a discovery that happened in 2011, showing that really southern Alberta could be seeing a new wave of interest.”

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