Daily Oil Bulletin, Sept. 15/09

Demand For Frac Sand Spawns New Industry

By Richard Macedo

The shift to more horizontal wells and multi-stage fracturing has spawned a growing interest from mining companies hoping to develop new sources of frac sand to meet surging demand from the oilpatch.

Sand is used as a proppant to hold fractures open after a hydraulic fracturing treatment and in recent weeks mining companies have reported success in finding new sources of supply that could be used in shale gas plays across North America. For Canada's most prominent shale gas development, the Horn River basin in northeast British Columbia, sources of sand supply are distant, which drives up costs, and makes transportation charges a large part of overall frac sand expenses.

Kris Petterson, a completions engineer involved with Horn River operations for **EnCana Corporation**, said the onus is currently largely on service providers to supply the sand, **adding that each well requires roughly 3,000 metric tonnes**.

"We, along with other operators, have all looked at self-sourcing," he said. "The mine we're currently pulling from is actually in...eastern Saskatchewan. Historically, a lot of proppant comes from the central (United States)."

"Anywhere in the patch that we use sand, almost two-thirds of the cost of that product is transportation. Ideally we'd love (supply) closer, we'd love to find one in B.C."

He emphasized that the sand must meet certain physical properties and finding the lowest-cost supply will be important as the play moves toward commercial production.

"Stimulation I'm going to say is a solid 50% of the entire well cost," said Petterson. "Sand would be in the order of four or five or six per cent of the total well cost."

This new demand from the oil and gas industry has caught the attention of mining companies.

Stikine Gold Corporation, a B.C.-based mineral exploration company, has secured title over several silica claims in the heart of major gas plays in northeast B.C.

The company recently completed an initial field program at a number of its 100% owned quartzite properties in the region to get an early assessment of its 17 properties, now totaling nearly 83,000 hectares of mineral claims covering prospective quartzite zones.

Stikine found that several of the properties meet the criteria for raw silica sources that could be used in the production of frac sand.

As resource plays such as Horn River and the Montney to the south continue to develop, more sand will be needed.

The company estimates that in 2009, approximately 300,000 tonnes will be required in the Horn River Basin alone and that up to two million tonnes per year will be needed when the field is developed over the coming years.

Costs for delivered frac sand have averaged roughly $300 per tonne this year with an estimated 80% of the current cost associated solely with shipping, handling and logistics to the area, Stikine estimates.

"What really struck us was when we heard about it...was the price that was being paid for frac sand delivered up north," said **Scott Broughton**, Stikine's president and chief executive officer. "We had heard that a year-and-a-half ago, they were paying $450 a tonne delivered, this is to the well.

"We scratched our heads and wondered 'why is anybody paying that much money for sand, first of all; but secondly why that cost?' We came to the conclusion that a large component cost of that delivery was simply the shipping and handling of it."

Broughton said the size of the market "blew us away."

"When you do the math, it's a massive market and much of it would be dollars just going simply to shipping if it came from...far away sources," he said. "For us, the size of the market, the value of the material and the longevity of the gas play...are the magic ingredients for making a very profitable and exciting mine."

The focus of field activities for the company in June and July of this year was to locate and define raw quartzite sources near the shale gas fields. Work to date indicates that the Nonda, Beav, Crow, Pet and Angus properties represent good opportunities to develop frac sand operations, subject to further tests, the company said.

Sampling and mapping at the Nonda property highlighted large-scale potential over an 11 500-metre by 1 000-metre area. Petrographic analysis of samples collected from Nonda indicate the rocks are very pure with up to 98% quartz made up of variably sized grains that fall within the required range for commercial frac sand.

While the in situ quartzite samples from Nonda and Stikine's other properties have generally angular grains, the company has completed preliminary laboratory tests that indicate simple crushing, tumbling and polishing can produce rounded silica sand grains in appropriate fractions, as required for commercial frac sands. Process development and laboratory trials are at an early stage but are continuing.

"What we were really happy to observe was that we can produce sand sized particles with very little effort and without any black magic," Broughton said. "We simply crush and go through a process of grinding to help to liberate those particles, those monocrystalline grains. That's what the industry wants."

However, it will take at least three years to be able to provide supply in commercial quantities, assuming a quick permitting process, community consultation and taking into account the seasonal nature of the work.

"This is the point we've been trying to make to gas companies," Broughton said. "We really have to be flying now with our exploration and define the resource and doing our...tests to prove up all of these concepts we have to be able to deliver full-scale production in three to four years."

Rob Cox, vice-president of Canadian operations for **Trican Well Service Limited**, said he wasn't familiar with the Stikine mine, but said that a local source with the right specifications could lower costs.

"Freight from mine to location can be a very significant component of the cost but also the production cost of the mine itself is a big component as well," he said. "The two of them work together. If you had an inexpensive or efficient mine that was close to location, that would be ideal."

The service provider has fraced for several companies in northeast B.C. And while traditionally producers have relied on the suppliers for sand, some operators are now starting to arrange for their own delivery. Getting sand from a mine to Fort Nelson from sources in Saskatchewan, Iowa or a number of other locations isn't particularly tough because of rail access, said Cox.

"A number of mines produce the sand of the quality and the quantity that's required up there," he said. "It's what you would consider to be a high-strength sand (and) because it's being pumped into deep formations, it typically has very high crush resistance.

"Just as long as you've got the lead time, you can get it to Fort Nelson. Typically you're looking at 15 days on the rail to get it from mine to Fort Nelson.

"If you've got a sizeable project...you'd want to start ordering sand four to six weeks before you do a big project," he added. "If it's a one-off well, it's going to be easier because there's going to be typically some storage either in Fort Nelson or some sand already on rail cars en route in speculation that it's going to be required."

Cox said there is more demand for sand now because of the changing nature of how wells are being drilled and completed.

"If we took a look just at ourselves as a company, the annual volumes of proppant that we would pump or sand that we would pump, it certainly has been on a tremendous rise," he said.

Robin Cook, an investor relations representative for Canadian mining company **Victory Nickel Inc.** said there has been a heightened interest from the company, and the mining community in general, in finding frac sand sources with the rise of oilpatch fracturing.

Victory recently said a resource estimate confirmed that a 15 million tonne "indicated sand resource" of which approximately 84% is marketable frac sand, is contained in the footprint of the proposed open pit shell at a 100% owned Minago nickel project 225 kilometres south of Thompson, Manitoba.

The marketable frac sand resource of 12.6 million tonnes represents a 215% increase in tonnage compared with the November 2006 preliminary economic assessment of the Minago nickel operation which considered only four million tonnes of sand to be within frac sand specifications.

This resource could be shipped to locations in Canada or south of the border, depending on economics.

"We are right beside the highway and 60 kilometres away from the railroad," Cook said. "Rail goes to the port of Churchill so in theory, we could ship anywhere from there."

The demand for high-quality frac sand should continue to expand given the development of unconventional resource plays such as the Montney and Horn River regions, the Barnett and Woodford in the United States and new emerging plays such as the Marcellus shale in the eastern U.S.

This could represent a significant new industry for Manitoba, the company said.