SM SPECTRUM
INVESTMENT ADVISORS

Fracking

Our due diligence trip to the Bakken Region in North Dakota - November 2013

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In November, Jonathan and I went on a three day expedition to visit my brother Rich in the Bakken Region of North Dakota to learn more about the fracking process taking place in that area. We flew into Williston, ND then drove 70 miles north where we stayed in Crosby, ND, seven miles from the Canadian border. This isn't a typical tourist destination; there are no Gray Line Bus Tours in the Bakken. If you don't know someone involved in fracking in North Dakota, it would be hard to grasp what's going on. The receptionist at The Guardian Inn hotel greeted us by saying, "No smoking, no pets, no excessive mud. Welcome to Crosby, North Dakota."

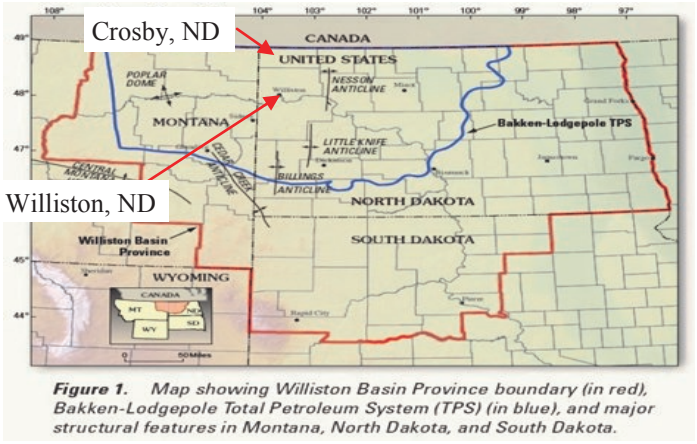


Figure 1. *Map showing Williston Basin Province boundary (in red), Bakken-Lodgepole Total Petroleum System (TPS) (in blue), and major structural features in Montana, North Dakota, and South Dakota.*

The advantage Jon and I have is that my brother Rich is able to give us first-hand knowledge of the fracking process, including being able to spend a day riding in his Freightliner tractor. Rich spent over 30 years in the plumbing business in Wisconsin (including work on our new Spectrum building). Tired of the competitive environment of the sub-contractor world, especially coming off the 2008 recession, he decided to buy a Freightliner Semi-Tractor with a tanker and headed for the Bakken on October 28, 2012, where he hauls water from the oil well sites.

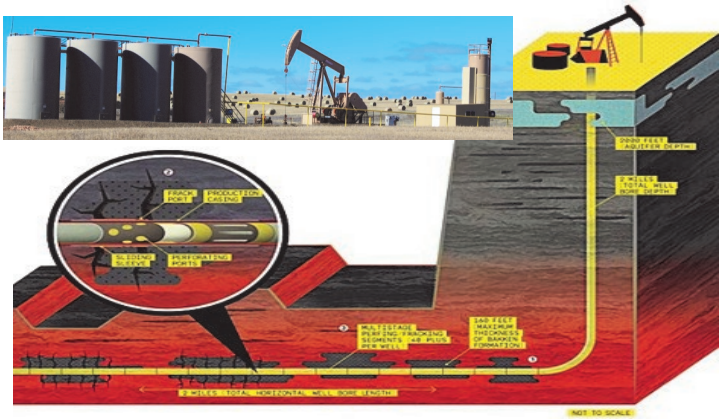
Fracking technology took off around 2006 and is most prevalent in Texas, Oklahoma, Colorado, Pennsylvania, North Dakota, and Wyoming (*FracFocus*). The process of fracking is drilling down two miles with a quarter mile to make the turn (in the pipe) and then drilling horizontally for two miles followed by using hydraulic pressure to fracture rock and release oil and gas. To learn more about fracking we suggest you read the book, *The Frackers*, by Gregory Zuckerman. The book explains how it took Texan **George Mitchell**, who died this summer at 94, 17 years to perfect the hydraulic fracking technology to crack the shale deep in the earth, long after major oil companies gave up. It gave us a better understanding of the enormous risks that wildcatter's take in the oil industry.

We were able to witness an actual fracking site where eight semis, owned by Halliburton, each with a 2,500 horse power engine on their trailer, were connected together to create 8,000 pounds of pressure. The fracking process, which typically takes four 24 hour days, uses water under immense pressure, with chemicals and fracking sand to drill two miles deep. Much of the fracking sand used comes from Wisconsin and Illinois. Drillers prefer Wisconsin white sand which is bigger and has rounder grains better suited for holding open larger pathways in the shale. It takes 25 rail cars of sand to frack one well (*WSJ 12/3/13).*

To protect against environmental issues, Rich explained that the size of the oil well pipe is 2 ½ inches in diameter, surrounded by a 4 inch pipe, surrounded by a 7 ½ inch pipe, surrounded by 2 ½ inches of concrete surrounded by a 10 inch metal casing, providing multiple layers of protection. According to Rich, an average residential well is 200-300 feet deep. A municipal well is usually 1,000 feet deep to match up with the two levels of the aquifer. In comparison, fracking takes place two miles below the surface.

Each well is attached to a pump, called a horsehead, because it resembles one (see below). Once a well is fracked, in order to release the pent-up pressure, the first step is to light the well to burn off the natural gas. At night we could look in any direction and see the glow of ten 20 foot flames burning off the natural gas of the new wells, while listening to the coyotes howl. Once the pressure is normalized, the engineers connect the horse head pumps and start pumping oil and natural gas. The oil industry doesn't rest; they go 24/7/365. Rich says the oil workers and truckers in the Bakken joke that when you are working seven days a week and 12 hours a day, you forget what day it is.

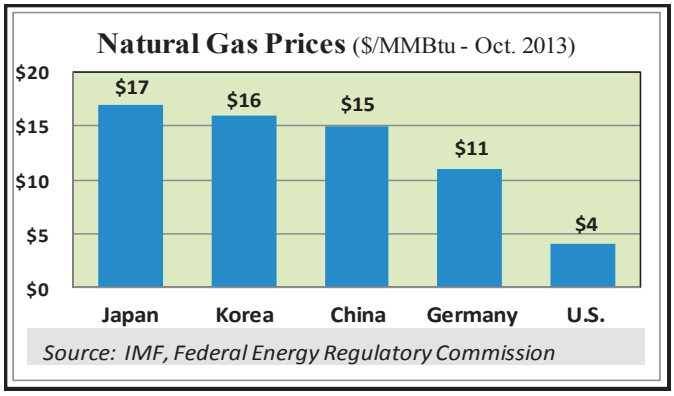
Rich also explained that one horsehead cycle (every seven seconds) produces about three barrels of liquid, made up of oil, saltwater and natural gas. Reaching the surface, the liquid flows into a separator where the heavier salt water sinks to the bottom, oil (lighter than water) rises to the middle, with natural gas on top. In the next stage, oil flows into 3-4 storage tanks with salt water in a separate tank. Rich's job is to pick up the salt water with his tanker and deliver it



to a disposal plant, which is then pumped back down one mile into the earth into deep caverns. Rich said the next technology will be to recycle the fracking water to use again for the fracking process.

The advantage that the Bakken Region of North Dakota, near the Missouri River, has, is an ample supply of fresh water found in ponds all over North Dakota. The fracking sites pump water directly from the ponds for the process. Each well pumps an average of approximately 60-100 barrels of oil a day from a 150 foot layer of shale two miles below the earth. Rich says the oldest well in North Dakota was drilled in 1953 and is still producing 20 barrels per day. Rich introduced us to an engineer from Continental Resources, the largest fracking land owner in the USA, who stated there could be more fracking potential below the current fracking shale. Technology exists today to drill two miles down, and will soon reach another layer of shale at 2 ½ miles and another layer at 3 miles. The bottom line is that the Bakken region likely has a 50-100 year supply of oil.

The Bakken Region currently produces approximately 800,000 barrels per day from 8,000 wells. The local paper in Williston, ND publishes the daily average drilling rig count on its front page. There are currently 184 rigs under construction in the area. The goal is to some day, in the next 10-15 years, have 40,000 Bakken wells, which could provide approximately four to five million barrels of oil per day. As a point of reference, the US currently uses about 18 million barrels per day. In addition to the Bakken, the Eagle Ford and Barnett Region, and the Permian Basin in Texas and the Marcellus Shale of Pennsylvania have similar fracking potential. **Together, these five regions, along with the Gulf of Mexico, Alaska, Canada, and Mexico, could produce enough oil for the USA to someday be independent of Middle East Oil.** Engineers indicate there could be enough natural gas for our country to begin exporting LNG-liquefied natural gas. This could help us to export our way out of a downturn, versus borrowing our way out of a downturn.



My brother, Bob, who has owned an industrial oil delivery company in Fort Wayne, Indiana for the past 30 years, says the Bakken Region produces a very light sweet crude oil that needs very little refining. The quality of the Bakken oil is second only to the purest sweet crude in the world, found in Saudi Arabia. **There are only a few major fracking areas in the world, led by the US, Canada, Mexico, Argentina, Venezuela, China, and Russia.** There is fracking potential in France but France has not allowed fracking. A major economy with no fracking potential is Japan. This, combined with their aging population and heavy debt load, makes it very difficult for their economy. (*Forbes 12/16/13)*

Jon and I came home with a greater enthusiasm for our country's economy because of the new fracking technology and the potential long-term positive impact on the markets. Stephen Leeb, author of the book, ***The Oil Factor*, states that historically, rapidly rising oil prices (over 50% increase in 12 months) present challenges for stock markets in the following 18 months.** Past performance is not necessarily an indication of future results. For example when oil increased from $2 to $11.05 (*Twilight in the Desert*) per barrel in 1973, it resulted in a subsequent two-year bear market loss of 31% on the S&P 500. When the price of oil tripled to $35/barrel from '98-'01, the S&P was down 22.1% in 2002. When the price of oil reached $140/barrel and natural gas reached $10/BTU in late 2007, a similar result occurred with the S&P 500 down 37% in 2008. However, oil was not the only reason the market went down in 2008. Stephen Leeb stated in his book, published in 2004, that unless a new oil drilling technology is created in the next few years, the world will run out of cheap oil causing oil prices to potentially rise to $150 - $200/barrel, creating inflationary pressures in the world economy, making it difficult for the markets to absorb. Fortunately, new drilling technology (hydraulic fracking) was developed, that has the potential of **giving our nation a durable competitive advantage** versus other world economies, which should hopefully keep the price of oil in the $80 - $110/barrel range. Engineers say that oil has to stay above $60/barrel to make fracking profitable. Oil needs to stay above $70/barrel for the tar sands oil region in Canada to remain profitable. Fracking helps makes it possible for the price of natural gas to stay in the $4/BTU range in the US (see below). As an extra boost to our economy, the cost to produce electricity in the US is half that of the average world economy *(Barron's 3/18/13)*. Fracking could allow the US to use less coal (which pollutes the air) and in the long-term, convert our electrical plants to natural gas versus coal.

As many of you know, Jonathan and I, along with key members of our Spectrum team, have attended the Berkshire Hathaway annual meeting in Omaha for the past seven years. At the April 2011 meeting, **Warren Buffett** was asked by a shareholder, "In the next 50 years, what sector would you invest in?" Warren Buffett replied, "Energy or technology, but I don't have the skills to pick technology stocks." His partner **Charlie Munger** said, "Technology that is related to energy." Known for investing in a big way, they ended up investing in fracking-related technology on February 12, 2010 when they bought the Burlington Northern Santa Fe (BNSF) Railroad that has four major rail lines going right through the Bakken Region. At Spectrum, we think that fracking is one of the reasons why Warren Buffett remains so positive about the future of our country.

Fracking is not the final answer to our nation's energy issue, but it should buy us at least 50 years to develop new alternative energy resources such as electric cars, natural gas, and/or hydrogen propelled vehicles. Finally, going back to my brother and Jon's uncle Rich, despite the high level of compensation he receives for owning his own semi in the Bakken, it takes a tremendous amount of grit to leave his family and sleep in the sleeper cab of his truck, and a very patient, loyal wife (Jill) to accept not seeing her husband for 6-8 weeks at a time. To illustrate how tough it is, of the 10 truckers Rich started with a year ago, he is the only one left. The rest went home. We look at Rich as a pioneer and a wealth of information on fracking. According to Rich, many of the truckers in the Bakken Region came from the state of Idaho. Idaho suffered immensely in the downturn in the economy because of their heavy concentration in the lumber and construction industry.

The receptionist at The Guardian Inn in Crosby, ND, said, "The fracking industry in the Bakken has saved families." I said to her, "the fracking industry is maybe saving the country." We are thankful Rich will be home for Christmas for the first time in two years. We enjoyed our experience in ND and wanted to share it with you.

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