Notes from the Motherland: Comrades in Energy

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Important disclosures appear on page 9 of this document.

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Why go to Russia?

- Russia is the world's largest oil (9.8mmbpd) and natural gas producer (59.2bcf/d). Its role as a key provider of gas to Europe and the subsequent impact on global LNG demand, sparked our interest and made it important to travel to Russia on a fact finding mission.

- David Pursell, Byron Pope and Stacy Nieuwoudt journeyed to Western Siberia and Moscow. Following are their observations about Mother Russia and the oil and natural gas industry.

Key Takeaways

- *Growth continues:* Russia, the world's largest producer of oil and natural gas, remains in growth mode. Although some are skeptical about future gains, we expect Russian oil production (including gas condensate) to grow 2 to 3% (~250kbpd) and Russian gas production to grow 1.5% (~800 mmcf/day) for at least the next several years.

- *Meeting incremental demand growth:* As Russia will be able to supply incremental demand growth in Europe via pipeline gas, more LNG cargoes will be available to the U.S. market, especially during the summer (seasonal trough demand period for Europe/Asia).

- *Western Services:* Russian companies are embracing Western service companies and technology as long as the Russians continue to own the reserves. Resource ownership is "back in the USSR"…but there are still ample oil service opportunities, (e.g. drilling rigs, directional drilling, pressure pumping).

- *Gazprom:* Don't underestimate the ability for Gazprom to achieve lofty goals (projects may be late, but they *will* be finished). The Company controls a large reserve/resource base and it cut its teeth in the Artic…when Gazprom finalizes a plan, expect them to "get 'er done".

- *Investment takeaways:* C.A.T. oil (Bloomberg ticker O2C GR) and Novatek (Bloomberg ticker NVTK RU) are two names worthy of a harder look for those looking to add Russia exposure to energy portfolio. Western oil service companies with a meaningful percentage of their total revenues from Russia include Canadian pressure pumpers Trican Well Service (TCW-T, Russia ~32% of 2007e total revenue) and Calfrac Well Service (CFW-T, Russia ~15% of 2007e total revenue). Schlumberger (SLB, Russia ~7% of 2006 total revenue) offers the most Russia exposure among U.S. listed large/mid-cap oil service companies.

Russia Energy Fact Sheet

2006 Data	Russia	% of World	U.S.	% of World
Gas Production	59.2bcf/d	21.3%	50.7bcf/d	18.5%
Gas Consumption	41.8bcf/d	15.1%	60bcf/d	22.0%
Gas Exports	17.4bcf/d			
Oil Production	9.8mmbpd	12.3%	6.9mmbpd	8.0%
Oil Consumption	2.7mmbpd	3.3%	20.6mmbpd	24.1%
Proven Reserves				
Oil	79.5 Billion Barrels	6.6%	29.9 Billion Barrels	2.5%
Gas	1,682 Tcf	26.3%	209 Tcf	3.3%
Coal	157 Billion Tonnes	17.3%	247 Billion Tonnes	27.1%
Refining Capacity	5.4mmbpd	6.3%	17.5mmbpd	20.0%
Number of Refineries	41		149	
Population	142mm	2.1%	301mm	4.5%
2006 GDP	1.75 Trillion USD	2.6%	13.1 Trillion USD	19.8%

Source: BP Statistical Review, CIA World Factbook and Tudor Pickering

Russian Oil Production Continues to Grow

- We had been concerned that increased Russian control of reserves has created a "Back in the USSR" operating environment where production growth would be unlikely.
- Given the continued use of modern oilfield technology and operating practices, there appears to be little to no slippage in the desire/ability to increase oil production.
- We continue to forecast 2-3%/year (~250kbpd) Russia production growth over the next few years. Far less than the 10+% growth seen in 2002/2003, but we do not expect the plateau that some have recently speculated.
- Hydraulic fracture treatments increase oil production 5x - 10x compared to un-stimulated rates at Priobskoye oil field (new wells) and similar success is reported in re-completions of existing wells in Western Siberia.

Russian Natural Gas Production Continues to Grow

- We highlighted in our LNG report (*LNG: A Global Natural Gas Market on the Horizon, February 26, 2007)*) that as the largest natural gas producer in the world and a key supplier of pipeline gas to Europe, Russia's ability to grow gas production is a wild card in the global gas/LNG markets in the coming years.
- Visibility/clarity on Russian gas production growth is difficult…but what we saw makes us optimistic that Russia gas production will grow in-line with our forecast (+1.5%/year, ~0.8bcf/d)
- Russia flares a reported ~2-6 bcf/day (wide range highlights the difficulty in a detailed assessment of Russian gas). By 2011, gas flaring will be more heavily taxed and we believe this should help increase marketable supply.
- Novatek is the largest *independent* gas producer in Russia, currently producing 2.5bcf/day …increasing to 6.5bcf/day by 2010. Point of reference – the most active driller in the U.S., Chesapeake Energy (CHK) produces ~1.9bcf/day.
- Internal price escalation, for non-regulated gas, by the year 2011 should create additional incentives to increase domestic supply. The current internal price is <$1/mcf and is expected to escalate to ~$5/mcf by 2011. Our contacts would suggest this tax regime change will, in fact, become reality.
- There are fewer near-term natural gas opportunities for Western service companies other than big ticket development projects and directional drilling services. Russian gas wells are typically very high deliverability and do not require significant completion expenditures.
- Expect more discussion/action on a potential natural gas pipeline to China. It is a huge undertaking, which will increase gas exploration/development in Eastern Siberia and create opportunity for Russian gas to move to European markets <u>or</u> Asian markets depending upon economic/political climate.
- Several people that we talked to regarding Gazprom suggested that project execution (i.e., timing) is a risk…but when Gazprom decides on a project it is likely to get done (even if it does not make sense to those of us outside Russia).
- A secondary issue – as Russian gas production increases, so does natural gas liquid (NGL) production. Moreover, as deeper gas is developed, the liquid yield from these deeper horizons is higher…further increasing NGL production, which effectively increases Russia's oil production/exports.

Lots of Resource – Undeveloped Areas

- Stated simply, there is a lot of natural gas in Russia that has yet to be developed. Estimated proved reserves are 1,680Tcf (26% of the world's total).

- Under-explored/developed areas such as Timon Pichura, Yamal Peninsula, and Eastern Siberia will provide significant opportunity to increase natural gas production (both pipeline gas and LNG).

- Significant deeper field opportunities also exist near the core producing fields (Urengoi and Yamburg) in the Novy Urengoi region.

Favorable Environment for Oil Service Earnings Growth

- The recent trend of Russia's government-controlled exploration and production companies taking a larger share/control of oil and gas reserves is not likely to reverse.
- However, these government controlled companies (Gazprom, Rosneft, and Gazpromneft) are now embracing/implementing oilfield technology as Yukos and Sibneft did several years ago.
- Our field visit to the Priobskoye oilfield, near Khanty Mansiysk, (special thanks to Trican Well Service) puts an exclamation mark on this point. In fact, the hydraulic fracture stimulation we witnessed was truly state of the art. For you frac geeks out there – a mini frac was performed with data sent back into town to finalize the job design. There was also on-site rheology testing of the gels for quality control…all in the middle of Siberia!
- As long as "Russia" controls the reserves, they seem willing to apply new technology through Russia/Western service companies to increase the value/recovery of these reserves.
- The pace of technology adoption is not rapid as the "West" because Russia is still mired in bureaucracy and the logistical challenges in Western Siberia further moderate the pace of development.
- Western oil service companies are working feverishly to increase their presence in Russia. This makes sense given the country is the world's largest oil and gas producer. Most Western-based large/mid-cap oil service companies have at least some exposure to the Russian market, but we think SLB is best-positioned among non-Russian players. We couldn't help but notice SLB service crews all over the Russian oil fields we visited.
- The Russian oilpatch is a relationship business and while we believe new entrants will likely be embraced, it will take some time (measured in years, not weeks) to forge meaningful relationships.
- Western-based SLB, TCW-T, HAL, BJS, and CFW-T all participate in the Russian pressure pumping services market and WFT is said to be expanding into the region. CRR is also active in Russia on the proppants side.
- Russian pressure pumper C.A.T. oil is a pure play on Russia/Kazakhstan and is a name worth getting to know.

Opportunity Knocks but It Ain't Easy…or…Logistics, Logistics, Logistics

- It appears Russia has a long way to go before becoming a paperless society. Paperwork is the backbone of bureaucracy and Russia seems to thrive on this element of control (one sees this just checking in and out of a hotel).
- Having been to Siberia and back, don't expect Tudor Pickering to enter the Russian oil service space. Lots of cold weather, bureaucracy and mind boggling geographic/logistical hurdles.
- Weather…winters are brutally cold so equipment and local bases/camps have to be Artic ready.
- Remoteness has challenges. Self sufficiency is a must. Service companies have self-contained operations from maintenance to all ancillary services. The start up costs/logistics take time, commitment and money.
- New/modern equipment is required. Russia is not the dumping ground for old, tired service equipment.

A Word about Drilling…Room for Improvement!

- On our site visit to the Priobskoye oil field we were able to see several Russian drilling rigs close enough to understand why TNK-BP has tendered for up to 60 new/refurbished rigs.

- The contrast of new, state of the art fracturing equipment working next to low quality drilling/workover rigs was profound. Since a picture's worth a thousand words… The photo below is of a rig reported to be only 2-3 years old!

Rig in Priobskoye Oil Field

- Rigs reportedly drill the Priobskoye wells in 30 days. They appear to be typical Western Siberian oil wells…drilled from a pad with no real difficult drilling conditions.

- New "built for purpose" rigs should be able to drill these wells in half the time.

- If TNK-BP is successful with implementing new drilling equipment (we bet they will be), others will follow and more wells can be drilled without an increase in overall rigcount. This is similar to what we have widely seen in the U.S.

More on Hydraulic Fracturing

- Hydraulic fracturing technology is relatively new to the Russian oil patch and has only been truly embraced since 2000.
- Re-completion work is steady (i.e. hydraulically fracturing existing oil wells) and growth is occurring from new field developments.
- Interesting that there appears to be a market for non-Russian well *cementing* where a few years ago this market was weak. It appears the desire to hydraulically fracture wells has created a need for better cementing…so expect some growth in this area.
- Hydraulic fracturing is working. A recent large fracture stimulation (~2mm pounds of proppant) resulted in an initial production rate of 6kbpd vs. typical well of ~1-2kbpd in the field. This explains why the number of frac spreads is increasing from ~60 to ~70 (+17% during 2007).
- A typical frac spread in Russia is comprised of 4-5 ~2k horsepower pumps, so our gut tells us Russia is a 500k+ fracturing horsepower market, which makes Russia the 2nd largest fracturing services market behind the U.S. (3.5MM+ horsepower). Canada #3 with ~400k horsepower. In dollar terms, the average revenue per Russian frac job is ~$100k range. The Russian frac market is conservatively ~$500MM as ~4,500 wells/year are frac'd (excluding those frac'd by Russian oil companies with captive frac fleets).
- We think Russia will ultimately need higher quality casing as fracturing becomes more common. Currently, fracture stimulations are pumped down a "work string" (tubing) to protect the casing from pressure and the frac slurry. Work strings have a useful life of <15 stimulation treatments before being retired. As stimulation sizes increase, there will be a need to pump down casing as the work string becomes a limiting factor due to small diameter.
- Working in Russia requires new equipment and state of the art fracturing techniques. Trican has a high-end lab at their field base (Raduzny) to test gels. The lab runs nearly 24 hours a day.
- Russia is a ceramic proppant market as there is no domestic supply of frac sand (hard to believe as all the oil field roads are constructed with sand!). While Carbo Ceramics (CRR) is in process of ramping up production at their new facility, two Russian manufacturers currently dominate the market. Borovichi is the largest player in the market (quality is estimated to be ~90% of CRR's) and Fores (~70% of CRR's quality) is also a quickly growing player.

Rigging up Hydraulic Fracture Stimulation in Western Siberia

Petrodollars are Creating Wealth

- Overheard in Moscow restaurant, where people are practically rolling in their wealth:
  - Vladimir : "Look at my new tie, I bought it for $2,000."
  - Ivan : "That's too bad, you could have gone another two blocks and purchased it for $3,000."
- Moscow is buzzing. Lots of traffic, high end cars and high end shopping. A big change since 2002 (last visit to Moscow) and a different world compared to 1995 (first visit to Moscow and Siberia).
- Siberia – seeing the evidence of increased standard of living. Unlike places like Nigeria, petrodollars are having an impact in the oil producing regions.
- A mere 50 yards from Lenin's tomb is an ultra high-end retail mall with shops like Dolce & Gabbana, etc. All we can say is wow!

Risks and Uncertainties

- Russian President Putin's term expires in 2008. We sense that his hand picked successor will continue with his agenda to increase global influence via energy exports…but always an unknown.
- Will Russia continue to leverage the political importance of gas and oil exports?
- Is there a political desire/will to wean from a resource based export economy to a manufacturing economy?

Byron, Dave and Stacy in front of Trican Crew Change Vehicle in Priobskoye Oilfield

RUSSIA…Still Growing!

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