Potash Update

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Dakota Salts EBY-1

The most recent permit for potash exploration in North Dakota is drawing to a close. Dakota Salts, LLC, a wholly owned subsidiary of Sirius Exploration PLC, was issued the permit in August of 2010. Drilling operations of Dakota Salts EBY-1 began on November 14, 2010 near the community of Lignite in Burke County and completed at a depth of 9,167 feet (2,794 meters) on December 15, 2010. The site was reclaimed in April of 2013. The State of North Dakota continues to hold the bond submitted for the permit. Pending the findings of a field inspection this summer, the NDGS will either release the bond or continue to hold it for further site observation or additional reclamation activity.

Dakota Salts collected 326 feet (99 meters) of core, now housed in the Wilson M. Laird Core and Sample Library, from the lower Dawson Bay Formation and part way through the Prairie Formation. In addition, 54 assays were taken over 43 feet (13 meters) of core in two intervals. The company reported total intersection of the Esterhazy Member, one of the major potash-containing zones, was 27.9 feet thick (8.5 meters) with an average grade of 11.8% potassium oxide (K_2O), a peak K_2O value of 41.0%, and carnallite ($KCl.MgCl_3.6H_20$) concentrations ranging from less than 1 to 60 percent (Sirius Minerals PLC, 2011). In solution mining operations, carnallite is traditionally a less desirable potassium source than sylvite (KCl) as higher concentrations decrease efficiency of cavern dissolution and potash recovery, and excessive magnesium concentrations in produced brine may require special processing (Halabura and Hardy, 2007). However, North Dakota appears well positioned to utilize produced brines with higher concentrations of magnesium chloride as it has been found to be the most effective dust suppressant for oil-traffic gravel roads and ice control for winter conditions on paved roads. A local source could alleviate the cost of shipping the product from out of state (Donovan, 2013).

Information generated from the Dakota Salts EBY-1 well shows that carnallite content is variable and can be relatively high. In comparison to an adjacent potash exploration well drilled in 1962 (TXL Gas Storage #1) the EBY-1 potash zones were less developed, demonstrating the thickness and character of the potash zones can change significantly over relatively short distances. This also suggests multiple exploration wells need to be drilled to properly assess North Dakota's resource potential. An additional benefit gained by this permit is that we now have a good set of electrical logs, core, and detailed core analyses through the section containing potash of the Prairie Formation all from the same well.

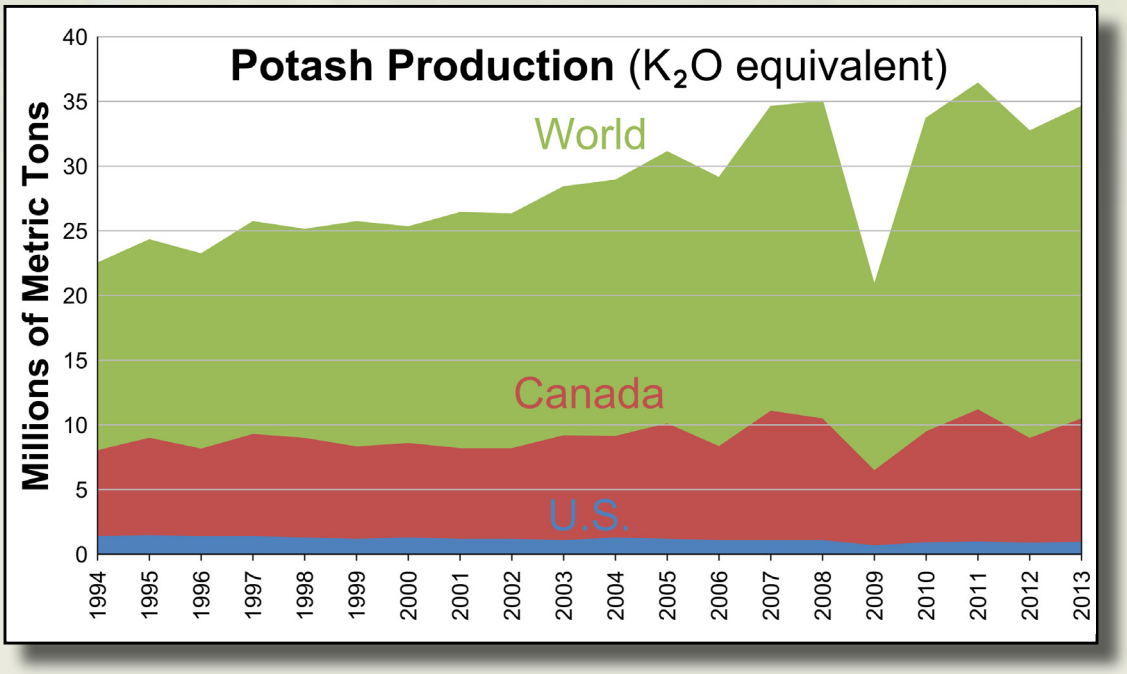

Figure 1. World, Canadian, and U.S. production of potash from 1994 through 2013. Source: U.S. Geological Survey Mineral Commodity Surveys.

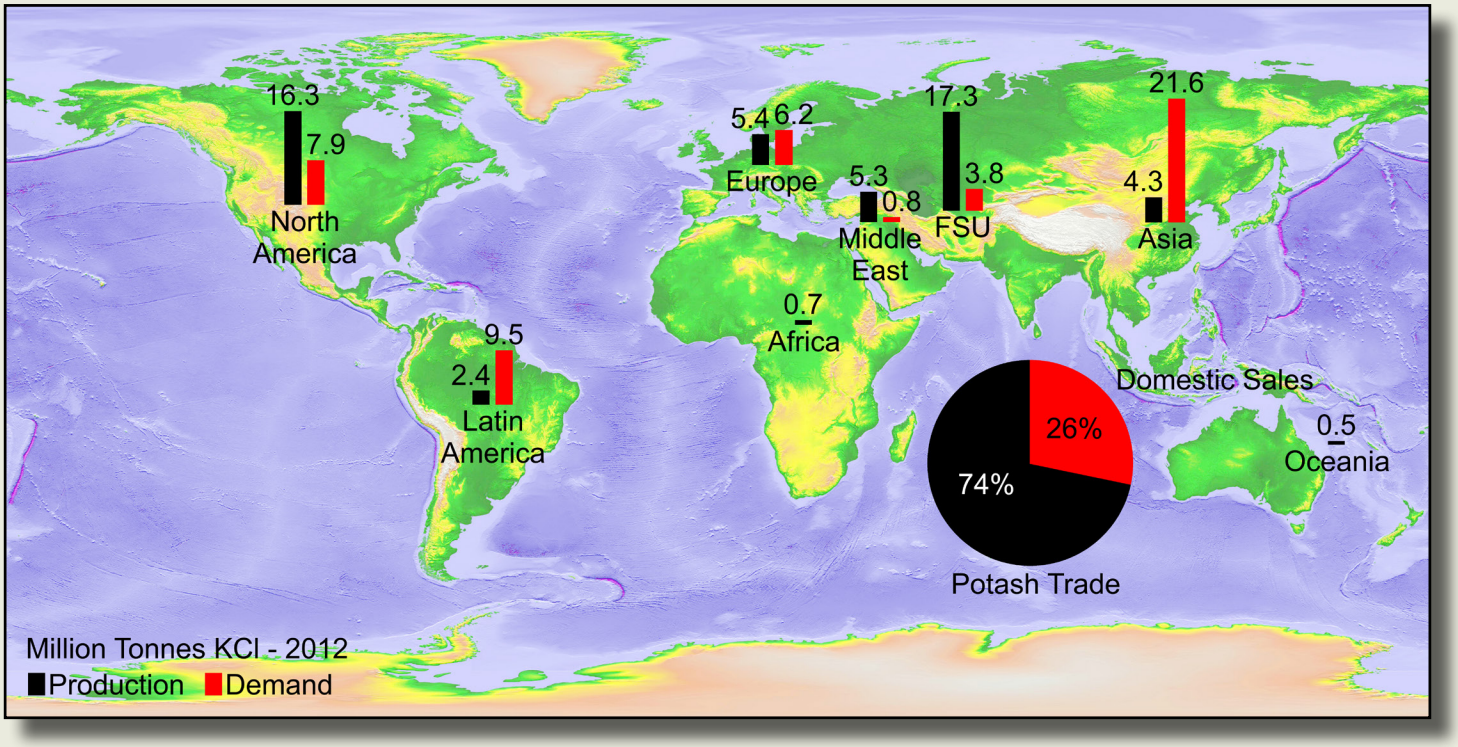

Figure 2. World production and demand. Major consuming markets in Asia and Latin America have little indigenous potash production and rely on imports. Source: Fertecon, CRU, IFA, PotashCorp

Worldwide Potash Developments

While the most recent potash exploration project in North Dakota played out, there were also notable happenings throughout the industry. Subsequent to the drop in potash production and pricing which followed the economic downturn beginning in 2008, worldwide production regained momentum in 2010 and surpassed pre-downturn levels for production in 2011 (fig. 1). Potash prices also rose in 2011, reaching $500/metric ton before leveling off. Production and pricing were mostly steady though 2012 and the first half of 2013.

In July of 2013, Russian mining company Uralkali unexpectedly announced that it would be ending its relationship in a Russian-Belarussian marketing cartel. As the world's largest potash cartel measured by exports, the Russian-Belarussian market cartel controlled roughly 40% of the world export market for potash and had power to influence the activity of other producers (fig. 2). At the time, Uralkali anticipated their actions would result in a 25% reduction in potash prices and announced that they would be moving from a pricing strategy to a volume strategy, as they benefitted from some of the lowest production costs in the world and have transportation infrastructure to major markets (Fundamental Research Corp., 2013). The story took a turn into the bizarre when the CEO of Uralkali traveled to Belarus at the invitation of Belurussian officials and was subsequently arrested. The CEO was charged with abusing power for private gain and imprisoned (Komnenic, 2013a). The president of Belarus called for a change in ownership of Uralkali as a condition for the CEO's release and for the CEO to repay $100 million in damages. Days later a change in ownership occurred. There is now some expectation that the cartel may reassemble (Komnenic, 2013b and Komnenic, 2014).

Canpotex, the Canadian exporting and marketing syndicate of Potash Corp. of Saskatchewan, Mosaic, & Agrium, has also not been immune to challenges to its influence on the market. In 2010, mining giant BHP Billiton made a failed attempt to gain a foothold in the potash industry via a hostile takeover bid for Potash Corp. of Saskatchewan, a move ultimately rejected by the Canadian government. BHP continues development of its Jansen Mine project, anticipated to eventually be the leading potash producing mine in the province, and has suggested that it may market its product outside Canpotex. Europe's biggest potash producer, K+S AG, is also constructing its Legacy mine in Canpotex's backyard, with production anticipated to begin in 2016. As potash prices fell in the second half of 2013 and buyers delayed their purchases in hopes of still lower prices, Potash Corp. announced it would lower production output and lay off 18% of its workforce. This turn in the industry has led to new media speculation that BHP may once again attempt a buyout of Potash Corp (Jamasmie, 2013a and Jamasmie, 2014).

Industry was thought to be operating at approximately 70% of production capacity as 2013 ended and prices in May 2014 were down 27% from May 2013 (fig. 3). Industry leaders expect the price decline to spark demand in 2014 to its highest level in ten years (Jamasmie, 2013b). Still, uncertainty is woven through the industry and Uralkali's volume strategy from outside its previous cartel arrangement may intensify competition within the industry.

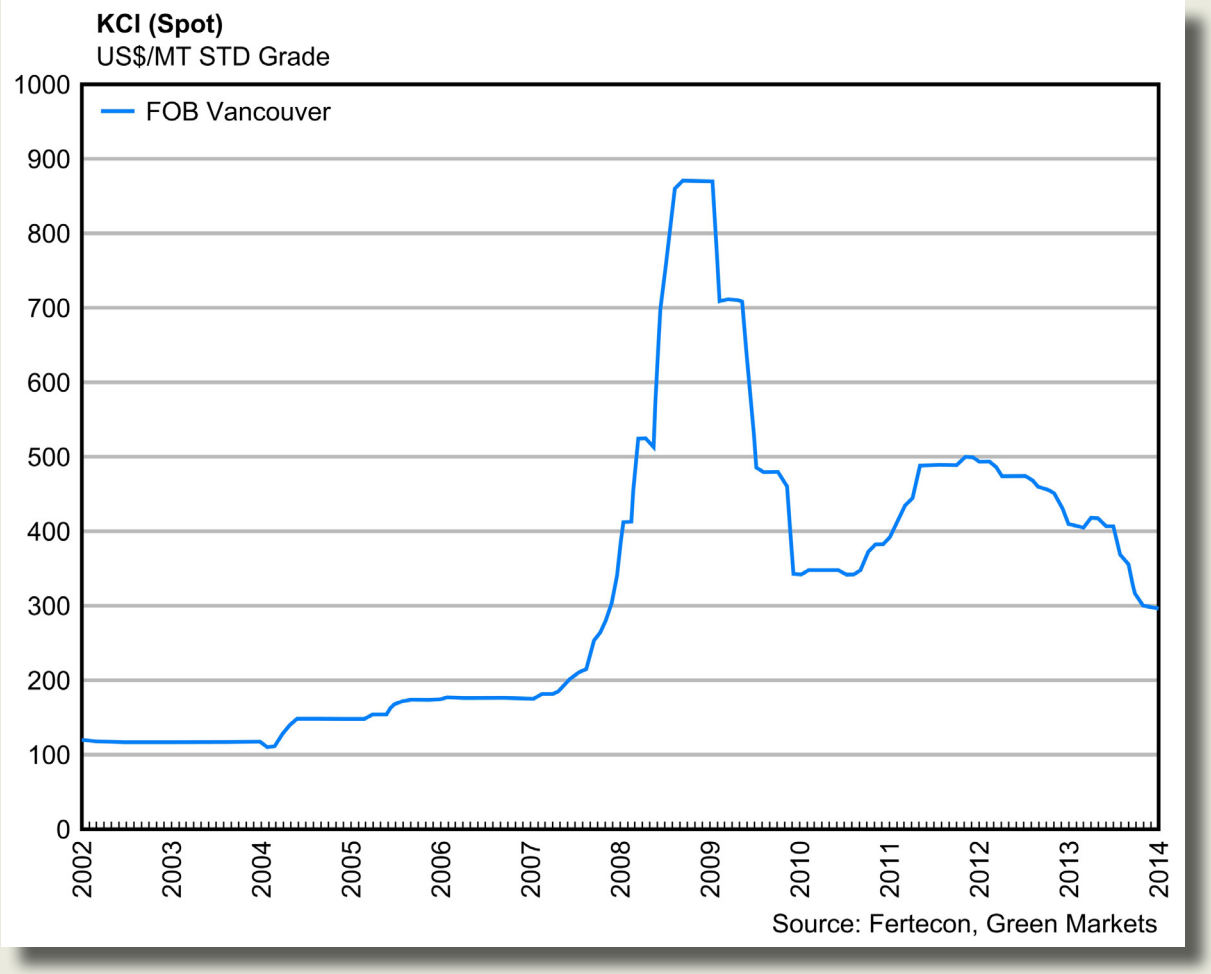

Figure 3. Potash spot market prices from 2002 to 2014. Prices have continued to move lower into 2014 with the most recent monthly average price of $287 per metric ton occurring in May 2014. Source: Fertecon, Green Markets.

References

Donovan, L., 2013, http://bismarcktribune.com/bakken/plain-old-saltwater-works-best-against-oil-patch-dust/article_ede76460-5603-11e2-8b6b-001a4bcf887a.html (retrieved 6/10/14)

Fundamental Research Corp., 2013, http://www.mining.com/web/uralkali-considers-dropping-out-of-cartel-sending-potash-shares-for-a-nose-dive/?utm_source=digest-en-potash-130820&utm_medium=email&utm_campaign=digest (retrieved 8/21/13)

Halabura, S.P. and Hardy, M.P., 2007, An overview of the geology of solution mining in Saskatchewan: Solution Mining Research Institute Technical Meeting, Halifax, Nova Scotia, Canada, Oct. 8-9, 18 p.

Jamasmie, C., 2013a. http://www.mining.com/canadas-potash-corp-laying-off-over-1000-workers-89519/?utm_ source=digest-en-potash-131203&utm_medium=email&utm_campaign= digest (retrieved 12/04/13)

Jamasmie, C., 2013b. http://www.mining.com/potash-demand-to-hit-decade-high-next-year-uralkali-64953/?utm _source=digest-en-potash-131105&utm_medium=email&utm_campaign= digest (retrieved 11/06/13)

Jamasmie, C., 2014, http://www.mining.com/bhp-going-after-potashcorp-again-report-26621/?utm_source=digest -en-potash-140415&utm_medium=email&utm_campaign=digest (retrieved 4/16/14)

Komnenic, A., 2013a. http://www.mining.com/belarus-to-cut-price-of-potash-to-300-30527/?utm_source=digest-en-potash-131119&utm_medium=email&utm_campaign=digest (retrieved 11/20/13)

Komnenic, A., 2013b. http://www.mining.com/uralkali-gets-new-owner-but-potash-prices-arent-likely-to-recover-46506/?utm_source=digest-en-potash-131119&utm_medium=email&utm_campaign=digest (retrieved 11/20/2013)

Komnenic, A., 2014, http://www.mining.com/the-end-of-a-bad-year-for-potash-producers-a-sprinkle-of-hope-in-the-new-year-47902/?utm_source=digest-en-potash-140107&utm_medium=email&utm_campaign=digest (retrieved 01/08/14)

Sirius Minerals PLC., 2011, [Press Release] http://www.infomine.com/index/pr/Pa986033.PDF (retrieved 06/23/14)