Sulfuric Acid Supply/Demand Fundamentals

May 22nd, 2017
NorFalco is the North American arm of Glencore’s sulfuric acid business...

- Glencore produces ~ 7 million tonnes of acid worldwide annually, most of which is sold by our marketing teams

- NorFalco, A Glencore Company, is one of the largest traders and marketers of sulfuric acid in North America
  - Sells 1.8 to 2.0 million tonnes per year, produced primarily by the group’s smelters in Eastern Canada – but backed up by several 3rd party offtake /marketing /distribution agreements as well
  - Fully integrated network of railcars, tank trucks, storage tanks, terminals, and seaborne vessels
  - Offices in Stamford and Toronto
  - Commitment to Product Stewardship and Sustainability
  - Delivering More than \( \text{H}_2\text{SO}_4 \) …
NorFalco operates one of the most reliable multi-modal integrated supply chain networks for sulfuric acid in North America...

- **4 Production sites**
  - 6 Acid plants
  - ~1.8 – 2.0 million tons

- **Tank cars**
  - ~2,300

- **Railroads**
  - All class I railroads
  - Most class II & shortlines

- **Tank trucks**
  - ~ 30 carriers

- **Transload Terminals**
  - 15

- **Import Terminals**
  - 2

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![Map of NorFalco's supply chain network with locations marked for production sites, transload terminals, and import terminals.]
NorFalco has a deep understanding of sulfuric acid’s end use and broader impact

NorFalco’s acid supply typically helps produce:

✓ 50 million tons paper & board products, approximately half of all US paper & board production!

✓ 39 million lead-acid batteries, this would supply batteries to 15% or 262 million total registered vehicles in the US!

✓ 1.07 million tons of aluminum sulfate, or ‘alum’, which can treat over 10 trillion gallons of drinking water. Enough to meet over half the US population’s annual drinking water needs!

- Food Products
- Pharmaceuticals
- Epsom Salts
- Fertilizer
- Ethanol
- Batteries
- Gasoline
- Pulp & Paper
- Water Treatment
- Metals Leaching
Sulfuric Acid Supply/Demand

2016 Global Production – 264 million tonnes (MT)

- Acid produced through the burning of elemental sulfur predominantly used in the manufacturing of fertilizers
- Pyrites are iron sulphide ores burned to produce acid, largely limited to China.
- Smelter acid production is more widely traded on the international market than others

2016 North American demand – 37 million tonnes (MT)

- Industrial Market for acid includes a wide range of uses across a broad scope of chemical processes
- Recycled acid primarily refers to acid used as a catalyst by oil refineries to boost fuel octane, the contaminated acid is burned and recycled back to refinery
Global Sulphuric Acid Trade Flows

Major Exporters:
- Canada
- Japan
- South Korea
- West Europe
- Peru

Major Importers:
- Chile
- Morocco
- USA
- China
- India
- Indonesia
- Philippines

Source: CRU

Based on 2016 Q1-Q3 (with addition of current known trade flows from 4Q16 and 1Q17) Only major trade flows >100,000 MT were included

Arrow thickness is representative of trade magnitude
## Key Pricing Drivers

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2015-16 reduction in demand from non-industrial sectors with moderate changes to supply resulted in over supplied market

• Demand side
  • Industrial demand showed relatively flat growth on macro basis: 2.4% GDP growth, shrinking Capacity Utilization throughout most of period, 0.3% increase in Industrial Production – led to minor growth in acid demand from industrial sector
  • Mining demand for acid came under pressure: primarily due to weakening of Copper prices, leading to significant mine curtailments (many of which used acid for leaching), leading to demand reduction for this sector
  • US domestic as well as International Fertilizer markets exhibited weakness: forcing key Producers to plan for reduced production, putting pressure on Tampa Sulfur price
  • International Vessel demand: weaker due to mining and fertilizer markets downturn

• Supply side
  • Vale Sudbury 100-300kt reduction originally planned for 2016 was delayed resulting in increase in supply vs. market expectations
  • Key European vessel markets were weak leading to increased supply pressure on North American market
  • Increased Mexican exports to US as traditional South American markets weakened.
Sulfuric Acid Market Pricing ($/MT)

- CFR US Gulf
- FOB NW Europe
- CFR Brazil
- CFR Chile – spot
- Sulfur FOB Tampa (contract) US/t

Source: CRU

*Sulfur FOB Tampa is based on $US per long tonne*
Demand growth potential in Industrial/mining combining with supply constraints leading to tighter market fundamentals

• **Demand side**
  - *Industrial demand steady growth on macro basis*: After a strong 2H 2016, GDP is projected to grow at a steady rate of 2.3% in 2017
  - *Upside potential for mining demand*: recovering Copper fundamentals signaling possible upside for acid leaching demand
  - *Stronger US domestic as well as International Fertilizer demand*: improved international vessel markets driven by growing regional demand
  - Various new projects on the horizon that consume material amounts of sulfuric acid, timing and financing yet to be determined

• **Supply side**
  - *Significant reductions in supply on the back of major producer turnarounds*
  - *Vale Sudbury permanent supply reduction on schedule for 2nd Quarter 2017*
  - *Further reductions in global supply due to unexpected force majeure events* (strikes, natural disasters etc.) has the market tightening in the short to medium term