

Oilfield drilling

Guar gum shortage impacts fracking market

- Guar gum prices soar
- Switch to slickwater fracking
- CMP pursues proppant market

Mike O'Driscoll

The humble guar bean of the Indian sub-continent is creating havoc with the booming hydraulic fracturing (fracking) market of North America.

Rocketing costs and shortages of guar gum are eroding the profit margins of leading fracking companies as well as influencing proppant material selection.

In the fracking process, guar gum is a key ingredient in the viscous fluids used to transport the fracking proppant, ie. frac sand or ceramic proppants such as calcined bauxite.

Guar gum is a polysaccharide derived from tissue of the guar bean. Its key property is as a thickener – guar gum has almost eight times the water-thickening potency of cornstarch.

The oil and gas drilling industry is experiencing severe guar gum shortages caused by substantially lower guar bean production in India and Pakistan which together account for >96% of world supply (India, 70%).

Experiencing high demand, mainly from the oil and gas industry, and particularly from fracking requirements, combined with a 20% drop in guar gum production, the price of guar gum has increased more than 500% in the past 15 months.

One report had Indian guar gum export prices having increased from \$5,000/tonne in October 2011 to \$20,000/tonne in March 2012.

According to a recent statement from proppant leader Carbo Ceramics, the situation is not expected to change during 2012.

Owing to the unprecedented rise in guar gum prices, India's Forward Markets Commission (FMC)

halted guar gum futures trading on 27 March 2012, and they are not expected to resume until September 2012.

A report in India's *Economic Times* said the price hike was triggered by shortages and physical cornering of stocks by traders in the spot market, which was mirrored in the futures market.

Influencing proppant use

With guar gel systems accounting for more than 30% of overall drilling costs, fracking operations are seeking alternatives.

But there are few options available. Jorge Fernandez, a research and development chemist, Louisiana, commented: "If you are looking for guar gum replacement for frac applications...then that will be pretty tough. Xanthan is a good replacement in terms of rheology, and also that it is readily cross-linkable, but it will not acid degrade as readily as guar gum, so most people will not risk the productivity of the well."

Therefore many fracking programmes are now pursuing slickwater treatments that forego guar gum, and use a much thinner liquid to transport the proppant.

However, in using low-viscosity slickwater fluids, these typically re-

quire small-diameter, low-density proppants.

Not surprisingly, ceramic proppant manufacturers, such as Carbo Ceramics, are reminding the market that lightweight ceramics have similar or lower densities than sand, which eases placement in the fracture but provides significantly higher flow capacity than similar sizes of sand, including resin-coated grades.

Certainly, ceramic proppants are widely acknowledged to have greater strength and thermal stability, to have more uniform size and shape, and to yield higher conductivity than frac sand.

No doubt this trend is being picked up by Chinese ceramic proppant suppliers which are already penetrating the US fracking market with calcined bauxite grades.

Link Peng, sales manager at Zhengzhou Top Trading Co. Ltd (subsidiary of leading Chinese ceramic proppant producer Xinme Wanli Industry Development Co. Ltd) said: "Chinese ceramic proppants make up about 15% of the North America market."

"There are abundant bauxite minerals in China. This is a big advantage other countries don't have," Peng added.

CMP aims at proppants

One of China's few remaining non-metallurgical bauxite suppliers, China Mineral Processing Co. Ltd, has recently purchased a new bauxite mine at Xiuwen in Guizhou province.

The new mine has proven reserves of 3m tonnes and the official mining licence was granted to CMP Xiuwen Mining Development in March 2011.

Open pit mining plus a single adit will initially be used to produce 100-200,000 tpa of non-metallurgical grade bauxite.

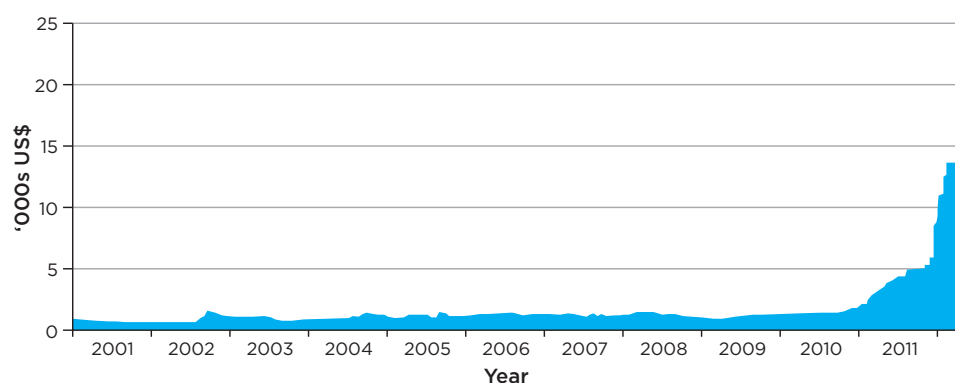
According to James Devlin, managing director, CMP Sales Europe, the mine is already producing abrasive and refractory bauxite grades, which are being toll calcined at local plants.

CMP is also looking to develop proppant and homogenous ceramic ball bauxite grades based on an ore grade of 74% Al₂O₃, at production capacities of 20,000 tpa and 30,000 tpa, respectively.

China's non-metallurgical bauxite sector has undergone significant transformation in recent years, and the outlook for bauxite exports is far from certain (see p.51: *Chinese bauxite: the way ahead*).

China's ceramic proppant sector and its influence on the US market is the subject of a presentation by Gene Kim, CEO of AM2F Energy, US at the IM Roundtable: Oilfield Minerals Outlook, 19-21 June 2012, Houston (see p.14-15).

Guar gum prices 2001-2011 (powder, 200 mesh, 3500 cps, \$/tonne)



Source: Thompson Reuters Datastream, Public Ledger