SULPHUR

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As demand continued to outweigh marketed production, mostly driven by demand from China, the sulphur market remained tight through 2003 and this trend has continued in 2004. Firm demand was reflected in higher prices, although mid-2003 saw a short-term dip. Many prices ended the year at more than double the levels prevailing at the end of 2002. The market has continued firm into 2004, but a sharp increase in freight rates in the second half 2003 meant that although delivered prices increased, some fob levels were eroded. Freight rates have since eased back to levels closer to those before last year's increase.

Supply developments
In order to conduct an analysis of the global sulphur market, it is necessary to look at sulphur in all forms. As well as elemental sulphur, we must also look at pyrite and exploited sulphur from off-gases from non-ferrous metal smelters. Non-elemental sulphur is generally used in the form of sulphuric acid. (See Table)

The most active and volatile sector of the market, in terms of volume, concerns elemental sulphur. Elemental sulphur is produced as a by-product of sour natural gas processing, sour crude refining, tar-sands processing and stack gas clean-up (recovered sulphur) or mined either by the Frasch method, or by conventional mining techniques (mined sulphur). Mined sulphur production, which is mostly produced by the Frasch method, has declined rapidly in recent years and now recovered sulphur accounts for over 98% of total world elemental sulphur production. Total elemental sulphur production in 2003 is estimated at 44.8 Mt, an increase of around 1.7 Mt on 2002.

Frasch sulphur is produced by injecting super-heated water into deposits to melt the sulphur. Then the solution is forced to the surface using compressed air. Only one Frasch sulphur mine is currently in operation, located in Poland. The only other working mine, situated in Mishraq/Iraq, suspended operations before the start of the last Gulf war. Once a major supplier of Frasch sulphur, production ceased in the US in 2000. World mined sulphur production in 2003 is estimated to have totalled 780,000 t, with a similar level expected in 2004.

World production of recovered sulphur was estimated at 44.8 Mt in 2003 compared with 43.1 Mt in 2002, representing an increase of just under 4%. This is mostly due to increased sulphur recovery from the refining of sour crude oil. Sulphur recovery at oil refineries increased from 17.2 Mt to an estimated 18.4 Mt in 2003, an increase of over 6%. There were increases in production in the FSU, Middle East, Far East and Latin America. Production also increased in 2003 in North America. The US remains the largest producer of oil-recovered sulphur, accounting for 39% of global production.

Meanwhile, Northwest European production was estimated at just over 4% higher in 2003 compared with 2002, and this trend is set to continue.

Sulphur recovered from sour gas production totalled an estimated 23.9 Mt in 2003 compared with 23.5 million t in 2002. Canada is the largest producer with an estimated 6.2 Mt in 2003, although production decreased by over 7% from 6.7 Mt in 2002. Russia is the second-largest producer with an estimated 5.4 Mt produced in 2003. This compares with 5.2 Mt produced in 2002, representing an increase of 3.7%. Saudi Arabia was the third-largest producer in 2003, with an estimated 2.15 Mt followed by Abu Dhabi with 1.87 Mt and the US with 1.84 Mt. Other significant producers are France, Germany, Kazakhstan, Uzbekistan, Kuwait, Iran, Iraq, Qatar and Mexico. Recovered sulphur from gas production is increasing in the Middle East and FSU although in decline in Northwest Europe.

World recovered sulphur production from other sources – oil sands, stack gases, etc totalled an estimated 1.72 Mt in 2003 of which over two-thirds was produced from oil- sands operations in Canada. In comparison, total production in 2002 was 1.6 Mt, representing an increase of 7%. Furthermore, this growing trend is set to continue, with new development in Canada and the start-up of heavy oil grading projects in Venezuela such as the Hamaca project, which comes on stream later this year.

Non-elemental sulphur production totalled 20.7 Mt in 2003 compared with 20.2 Mt in 2002. There are two components that fall within the category of non-elemental sulphur – pyrite and 'other forms'. Pyrite production in 2003 was an estimated 5.5 Mt compared with 5.1 Mt in 2002. China remains by far the largest consumer of pyrite, accounting for over 75% of total world demand. Pyrite usage in China had been in decline as some pyrite-based sulphuric acid plants closed or converted to elemental sulphur, in some cases due to environmental pressure. Also, new sulphuric acid plants in China are generally built to use only elemental sulphur, given that such units are much cheaper to construct compared with pyrite-based burners. However, there are signs that pyrite use in China is now stabilising. Other-forms sulphur production essentially consists of sulphur recovered in the form of sulphuric acid at non-ferrous metal smelters. Production increased from 15.3 Mt in 2002, to an estimated 15.6 Mt in 2003, an increase of 2%.

Demand developments

Consumption of all-forms sulphur increased from 62 Mt in 2002 to an estimated 63.5 Mt in 2003, an increase of a little over 2%. Demand is primarily dependent on the phosphate fertiliser industry. All-forms sulphur consumption in the fertilizer sector benefited from strong demand for phosphates in 2003, a trend that is forecast to continue.

Market balance

The basic supply/demand data appear to show that the market is in surplus. However, some production – in some non-rail connected parts of Western Canada and in Kazakhstan – is not marketed due to logistics and cost

constraints and is put into long-term storage, or “poured to block”. Most other suppliers do not hold long-term inventory. In Kazakhstan, the recovered sulphur producer Tengizchevroil, has come under severe pressure from the government to remove the sulphur inventories, and has even been fined. Tengizchevroil has now begun exporting sulphur, both direct by rail to China and offshore through Russia. There were some delays to the start-up of offshore exports owing to technical problems with granulation, and this contributed to the tight market in 2003. Production is expected to return to levels closer to full capacity by the end of 2004 once these technical issues have been resolved.

There is an increasing reluctance on the part of suppliers to pour to block as it could be seen as an environmental liability in the future. Other options are being looked at to dispose of sulphur where there are logistical constraints, including re-injection of hydrogen sulphide and burying of sulphur.

Market developments

The sulphur market continued to firm through 2003 and into 2004. The major factors driving the market included strong demand from the phosphate industry and continued growth in demand from China. In first-half 2003 contract negotiations, prices increased by up to US$20/t from lower levels in late 2002. Vancouver prices increased from the US$32-44/t fob range to the US$38-70/t range. Meanwhile, Middle East prices increased from the US$27-60/t range in December 2002, to US$43-77/t fob in January 2003.

In the US, prices increased by US$3/long ton for the first quarter 2003, taking the price to US$60-63/long ton. The increase was indicative of stronger demand and lower supply. Lower supply was partially attributable to the processing of less sour crude.

Prices continued to firm in the second quarter, with US prices increasing by a further US$8/long ton. Middle East prices edged up to a high of US$82/t fob on the back of firm demand and relatively high net backs available in China. In the second quarter, market prices reached a peak when prices close to, and in some cases in excess of, US$100/cost and freight (cfr) were achieved in India and China for spot cargoes.

The pace slowed early in the second half as the Indian market started to weaken. Levels of cfr in India edged down driven by lower demand and by the end of July spot tonnes were being offered as low as US$71 cfr. Meanwhile, retail prices in China decreased to around US$70/cfr after demand collapsed as a result of buyer resistance to the high prices being driven by suppliers. Buyers in both of these major markets continued to hold off purchasing in anticipation of even lower levels, thus prolonging the bearish tone.

In negotiations for the October-March contract period in Brazil, buyers secured prices for Canadian supply at a rollover to levels agreed for the April-September period in the low-mid-US$60s. US prices in the third quarter

decreased to US$64-67/long ton central Florida, a decrease of US$4 from the second quarter and indicative of the downturn in the market.

Towards the end of the third quarter and into the fourth, prices began to stabilise. Middle East fob levels increased by a couple of dollars from a high of US$62/t fob through most of the third quarter. Levels edged up through the fourth quarter to a high of US$75 by the end of the year. Meanwhile, cfr levels in China, which had edged down to a high of US$75/cfr through most of the third quarter, gathered pace through the fourth ending the year with a high of US$92/cfr.

In the fourth quarter, US prices increased by US$3, indicative of the firming of the market. Levels in India, as well as China, also firmed but at this point a new factor came about which adjusted the dynamics of the market. Freight rates suddenly shot up, driven by demand for vessels to import and export a wide range of commodities in Asia, most notably China and India. In many cases the high rates had not had a major effect on contract business owing to the existence of Contracts of Affreightment. However, as these expired, or were defaulted on, buyers and suppliers faced a quantum change in the cost of freight.

At beginning of the second quarter this year, high freight rates started showing signs of weakening on some major supply routes, and have now cooled to below 50% of their peak at the end of 2003. As demand stemming from China was the major driving force behind the surge in freight rates last year, its own governmental policies to control economic growth has resulted in the cooling in demand for vessels and thus an easing in rates this year also.

US prices remained stable in the first quarter of 2004 and have remained at the same level since increasing in the fourth quarter 2003. Meanwhile, first quarter prices in China increased to around US$90/cfr from the mid-high US$70s range, although the agreed level did not cover the increases in freight charges that Canadian producers incurred. Prices then firmed as contract levels increased for the second quarter edged up to the US$93-94 range.

Outlook

Key factors in the development of the sulphur market over the balance of 2004 include Chinese demand and prospects for the phosphate industry.

Provided the phosphate market does not falter, the sulphur market should remain firm for the remainder of this year. From a longer-term perspective, given the rapid growth of sulphur demand in China and its aim to become self-sufficient in phosphate production by 2010, this could have a major impact on US sulphur demand. As many new phosphate projects are either constructed or commissioned in China, the level of phosphate imports from the US will inevitably decrease. Not only will US phosphate production cool but sulphur demand will also ease in correlation. However, there is unlikely to

be an impact on worldwide sulphur demand, given increasing demand in China to reach its target of phosphate self-sufficiency.

Demand for sulphur in China was around 5 Mt in 2003 and is forecast to increase to 6 Mt in 2007 and 7 Mt by 2010. Canadian suppliers, who offer China its largest source of supply, will aim to maximise exports and increase production through the remelting of stockpiles and constructing additional forming capacity.

Although a massive supplier, Canada is unable to meet the sheer wealth of Chinese demand. It is therefore necessary that supply be fluid from other producing countries. In 2003, there was a massive increase in supply from the Middle East compared with previous years. In the first quarter of 2004 the pattern was not the same because of constraints posed by high freight costs. But now we are seeing a return to Middle East supply to China now that freight rates have decreased. Furthermore, with new gas and oil projects due to come on stream over the next few years, Middle East production is set to increase and China will remain an ideal market to place additional supply at good net backs, certainly compared with those offered by more traditional markets such as North Africa.

In the longer term, there is continued interest in investigating gas-producing processes that do not lead to sulphur output, generally through re-injection. Should these processes become technically and economically viable, it could change the market fundamentals of the sulphur industry.

World sulphur supply and demand (Mt of sulphur equivalent)

	Supply		Demand	
	2002	**2003**	**2002**	**2003**
Elemental	43.1	44.8	41.3	42.3
Pyrite	5.1	5.5	5.3	5.7
Other-forms	15.1	15.2	15.3	15.6
TOTAL	**63.3**	**65.5**	**61.9**	**63.6**